AUTOMOTIVE INDUSTRIES

LAND — AIR — WATER

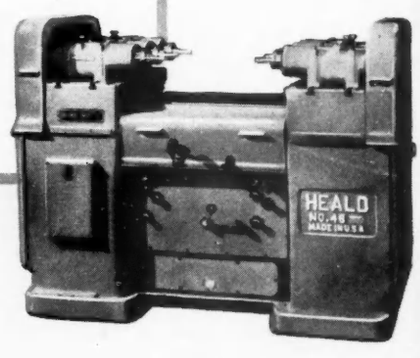
OCTOBER 15, 1940

JUST "6 Bits worth" OF TUNGSTEN CARBIDE

BUT IT MEANS REAL MONEY TO YOU IN PRODUCTION

A little hunk of tungsten carbide doesn't look like much, and it's only worth "6 bits." But take that same piece of dull, ordinary-looking metal, shape it and lap it, braze it in a shank, put it on the right machine, and it will be worth real money to you. That's why Heald Bore-Matics are built specifically to use tungsten carbide tools, because with "right design" they produce superior accuracy and finish, consistently and economically, on a production basis.

That's the reason you'll find in Heald Bore-Matics features that get the most out of this process, features like extremely rigid construction throughout, velvet-smooth hydraulic table control, force feed lubrication to table ways, ample flat and V ways for stabilized table travel, smooth, powerful V belt drive to boring heads, super-precision bearings with automatic preloading in boring heads . . . features that will make "6 bits" of tungsten carbide look "like a million" in your shop. May we send you literature?



Specially built to use tungsten carbide and also diamond tools. Heald Bore-Matics are available in a complete range of styles and sizes to exactly meet your requirements in precision finishing.

MANUFACTURERS OF PRECISION BORING AND PRECISION GRINDING MACHINES

THE HEALD MACHINE CO. WORCESTER, MASS. U. S. A.

AUTOMOTIVE INDUSTRIES
The Automobile

Reg. U. S. Pat. Off.
Published Semi-Monthly

Volume 83 Number 8

CONTENTS

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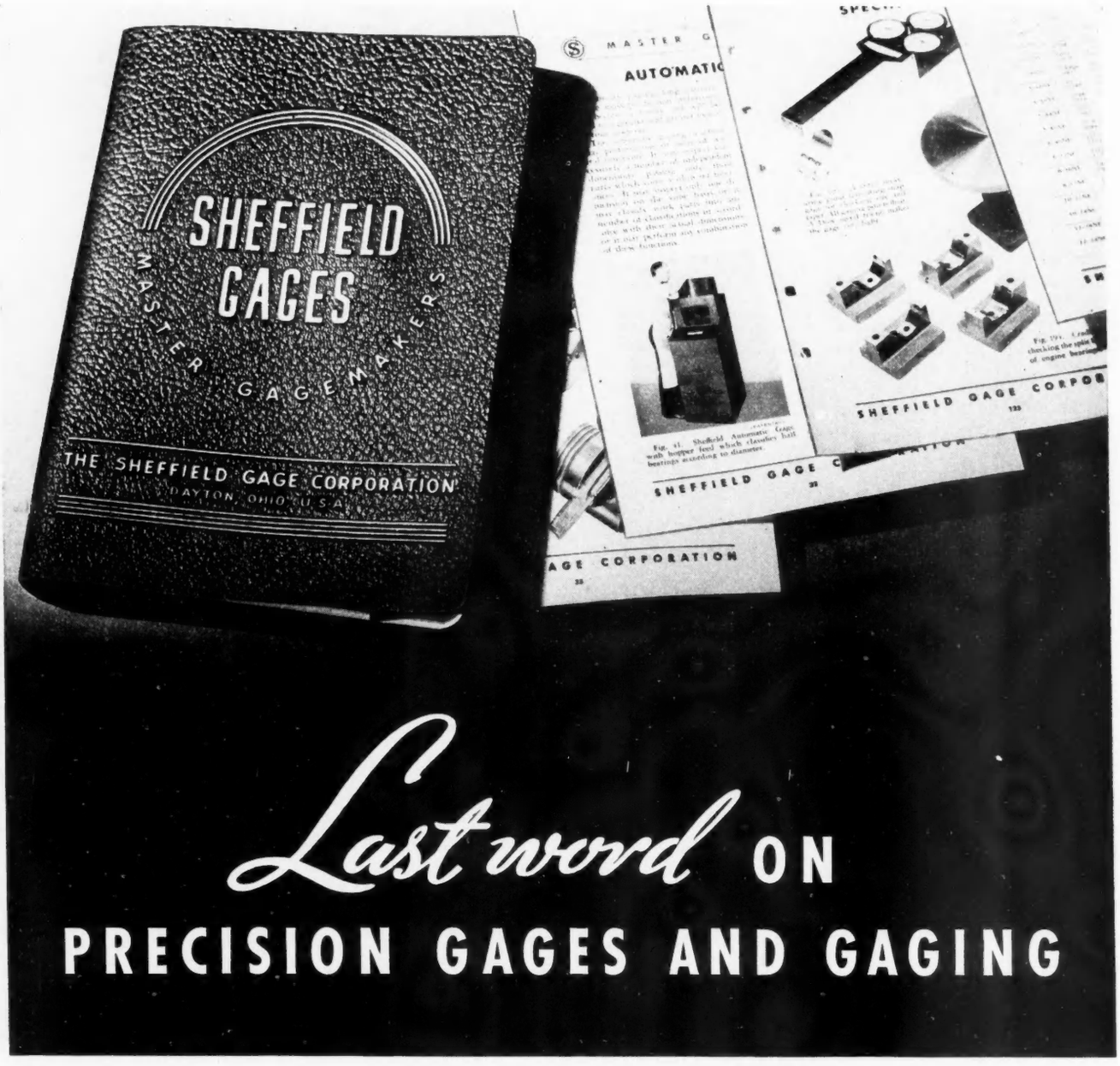

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IN THIS ISSUE . . . .

AUTOMOTIVE INDUSTRIES

Reg. U. S. Pat. Off.

Volume 83 October 15, 1940 Number 8

In a radio broadcast on the night of Sept. 19, Donald M. Nelson, National Defense Coordinator of Purchases, said that the broadest problem involved in coordinating Government purchasing activities relates to the fitting of military defense requirements to productive capacity with a minimum of interference with normal business. This, it was pointed out, requires that the National Defense Advisory Commission be constantly alert to the effect of the impact of the commission's purchasing upon the whole social and economic system. The commission, he said, had cleared contracts, which were subsequently awarded by the Army and the Navy, in excess of $6,000,000,000.

Discussing the commission's principles to control the letting of defense contracts, Mr. Nelson said that, unlike the former common practice to award them primarily on the basis of price, the commission decided there were other pertinent circumstances to be taken into account that should be given weight to assure the maximum utilization of the human and material resources of the nation.

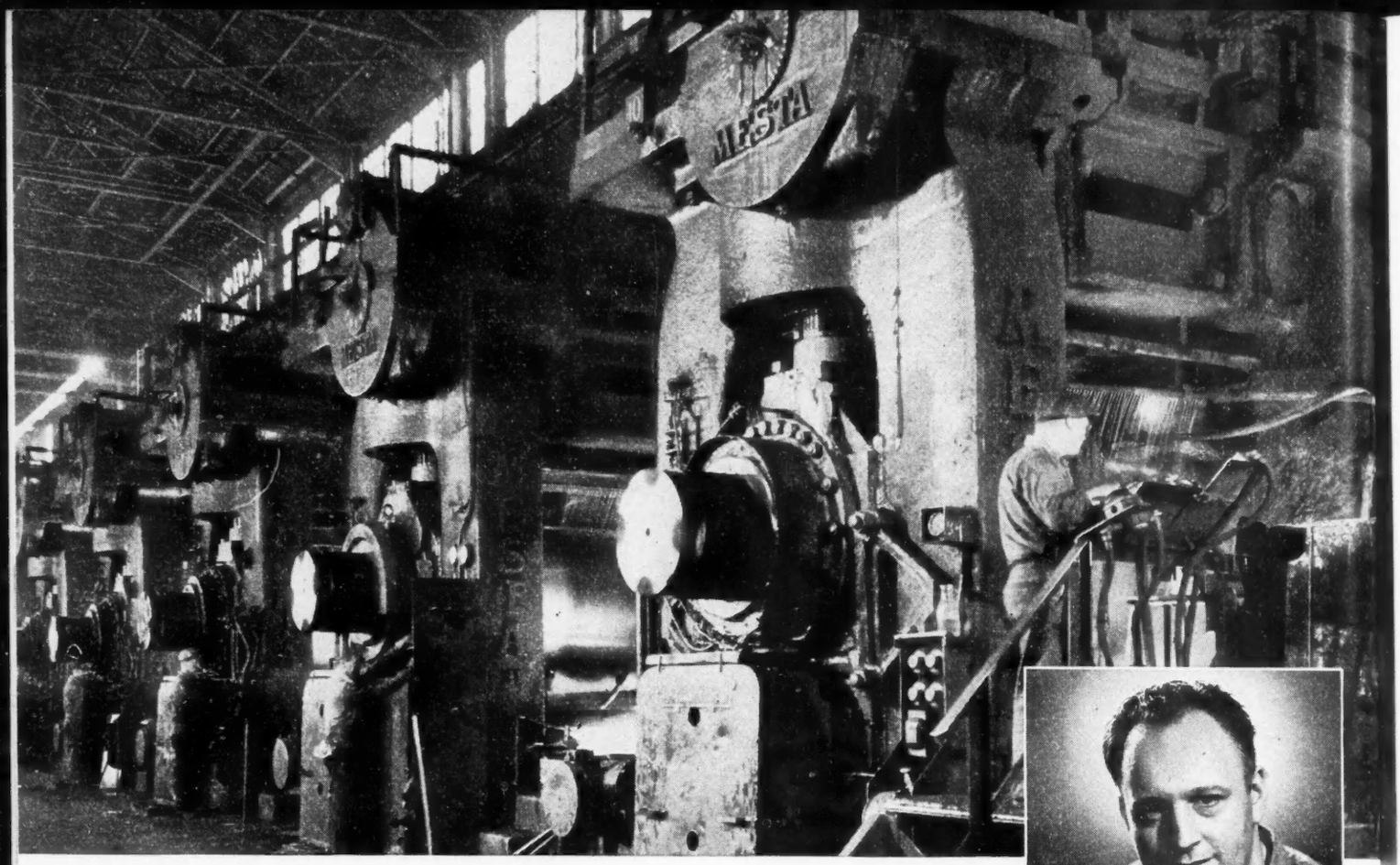
Naturally, it was stated, the first consideration is speed of delivery with orders placed in such manner as to insure the most efficient use of each particular facility from the point of view of the whole program. Assurance of proper quality was also said to be of prime importance and that, therefore, it is necessary to determine whether the prospective contractor can meet specifications. These specifications, it was stated, should come as near as possible to coinciding with commercial standards so that existing productive machinery may be used wherever possible.

"Under the general principles adopted by the commission to govern the letting of contracts, price is, of course, given due consideration. It is of outstanding significance," said Mr. Nelson. "Every effort must be made to assure its reasonableness, and we must take into consideration a proper appraisal of the costs involved in the production of the particular item."

Regarding the question of geographical distribution of defense orders, Mr. Nelson said that it should be emphasized that the commission does not determine location of new plants and facilities. That, it was declared, is the responsibility of the armed services and the commission's part in the process is entirely advisory.

"I can say that we are as much opposed to the undue geographical concentration of defense orders as is the man who doesn't get one," said Mr. Nelson. "A system for placing orders is being worked out which we hope will give the widest possible geographic distribution consistent with the strategic and economic interests of the defense program. We do not do this for political purposes or for what are known as pork-barrel reasons. We do it in the interest of military strategy and to eliminate confusion with resultant slowing up of production. It is also hoped to stimulate decentralization of industry.

"Under our procedure for letting contracts, unemployment is a major consideration. We try to avoid orders being placed in communities where industrial facilities are at or near peak of production and unemployment is, therefore, at a minimum when other communities have idle or partially used facilities and a heavy burden of unemployment."



Modern Mills and Skilled Men
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INLAND TRADITION FOR QUALITY

FROM the day Inland made its first steel, emphasis has always been placed on use of the most modern equipment available, the most advanced processes, and men of special training and great skill—the combination which assures highest uniform quality of steel mill products.

Because of this tradition most of Inland's steel-making and finishing equipment has been replaced within the past few years. Typical of recent improvements are: modern blast furnaces; new open hearth furnaces; a blooming mill of exceptional speed and flexibility; new 44-in. and 76-in. continuous sheet and strip mills; latest types of cold reduction mills, a completely rebuilt galvanizing department; new tin mills for production of tin plate by the modern cold reduction method; and, new furnace and mill control devices that automatically guard quality and uniformity. The Inland steel mill is as modern as any in the world.

Operating the Inland mills are steel makers and metallurgists who know and produce uniform, high quality steel. They are men who have added much to the science of steel processing, and they can be counted on for important advancements to meet the needs of the future.

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AUTOMOTIVE INDUSTRIES

Published on the 1st and 15th of the month

Vol. 83, No. 8
October 15, 1940

The Shows are Dead.

Long Live the Shows!

By HERBERT HOSKING

THIS YEAR'S automobile show in Philadelphia *would* have been the fortieth. But 70 per cent of the dealers in the area turned thumbs down on the show, which is the oldest event of its kind sponsored by dealers for their public.

In New York, the National Automobile Show began on Columbus Day a good "shopping holiday" in New York, with the accustomed fanfare. In Chicago and Detroit and Pittsburgh, the dealers will carry on with automobile shows pretty much in the tradition of four decades of automobile show-business.

But, in a baker's dozen cities which have been putting on automobile shows for many years, the lights in the municipal auditorium, or the market building, or the Coliseum will be dark when show time approaches.

What goes on?

First of all, the refusal of dealers to finance shows, without direct factory subsidy bearing at least part of the cost, is a symptom of rebellion which has been fermenting in the dealer body for a matter of three years or more.

Three years ago, or more, able automotive trade association executives were discussing the futility of shows which opened their doors under the handicap of dealer apathy and factory indifference. In some cases the dealer apathy was blamed on factory in difference and in others on the unwillingness of dealers themselves to face squarely the problems of a cooperative attempt to improve their business. Attendance at automobile shows has been dropping off, except where it is bolstered by expensive entertainment accompanying the display of automobiles.

The introduction of a large number of new models a month or more ahead of the actual date of the shows has tended to reduce public interest in paying to see what has already been seen. The timing of the shows in the autumn has had to compete with rising public interest in football and other mass spectacles. The radio has cut into automobile show attendance as it has affected attendance at the moving pictures and stage plays.

These things are symptoms of a broad social evolution which has affected automobile shows as it has affected many other aspects of everyday life. Certainly the automobile industry, which understands so well the economic necessity of planned and ceaseless progress, should be able to understand that such changes are inevitable.

So far as shows are concerned, we find ourselves at the crossroads, and the crossroads position is always accompanied by doubt, uncertainty, and argumentative rationalization. The reasons which have tended to force automobile shows off the calendar are not nearly so important now, as the consideration of what is next to come.

The New York Automobile Show, with factory sponsorship, able management and the additional glamor of being the first big gun in the concerted introduction of new models, retains a great deal of its former prestige. A sophisticated public, however, having been treated to free spectacles by many other industries, wonders why it should pay to see something it plans to buy.

Automobile shows in a few other large cities will probably continue to maintain a certain favorable position in the public mind, and will continue to be held. In some small cities, on the fringe of the marketing areas of larger cities, new automobile shows may spring into being, taking advantage of the fact that the metropolis is not holding a show, and, therefore, presenting a certain novelty to the local public.

All of these things, again, may be regarded as symptoms of transition.

The sound fundamental reason back of holding automobile shows was the idea that they gave the prospective purchaser of a new automobile an opportunity to look at all cars under the same roof. Comparisons in appearance, price, and mechanical features were facilitated, and the purchaser could leave the show feeling that he had been a smarter shopper than as if he had made his weary way from one show room to another.

Dealers with showrooms unfavorably located, welcomed the show as a means of getting a crack at the

There is a possibility of a new type of automobile show.
It might be a functional show and not one that expects the public to figure out its own answers.
It is time for automobile shows, if they are to survive, to awake and sing and present their wares in a new way.

gravy trade. Salesmen were kicked out of their usual apathy into a certain bright eyed concern with being able to lure prospects from the passing crowd.

But all that seems, as we write, largely a part of the past.

Where do we go from here?

This writer believes that a different type of automobile show will emerge, and survive.

It won't be an automobile show whose principal attraction is women's fashions, grand opera, or souvenirs. It won't depend upon music, lights and ground out publicity for its effects.

It will take a lesson from the Ford and General Motors and Firestone exhibits at the World's Fair. It will show how automobiles are made, in terms of exciting machinery in action. It will show how automobiles are styled and colored in terms of brains at work. It will show how automobiles affect the world in terms of what they will do and how they do it. In brief, it will be a functional automobile show, and not one which parks a lot of automobiles in one place and expects the public to figure out the answers for itself.

The things the public doesn't ordinarily see, in the background of automobile production, will be brought into the full light. For two decades the industry has been talking about styling being the paramount factor in the appeal of new models. Hardly ever has the public been shown, in concrete detail, how automobile styling is born. The new automobile show may show draftsmen, sculptors, pattern makers, and artists at work. It will show the toil and thinking which precede the apparent ease and facility of the mass production processes.

It may show an experimental engine on the dynamometer. It may show a profilography in use. It may explain, in terms of the actual machines, the use of hard faced cutting tools and especial tooling. An effective demonstration would be made of the final inspection routine before a car is released for shipment.

In any automobile plant there are literally hundreds of demonstrable things which the public doesn't know about and in which it would be interested. Effective showings of a lot of these things could be made without untoward expense.

In a word, there is the possibility that a new type of automobile show, functional in design, and thoroughly aware of changing trends in public appetite for showmanship, will emerge from the ashes of the present kind of automobile show.

It may be held in fewer cities, and on a regular "circuit." It will necessarily be dependent on factory and national association sponsorship for effective handling. It will be advertised to the public on an intelligent basis. It will keep in mind that automobile shows must change with the automobiles themselves, and that the less change in the cars, the more necessity for dramatizing them.

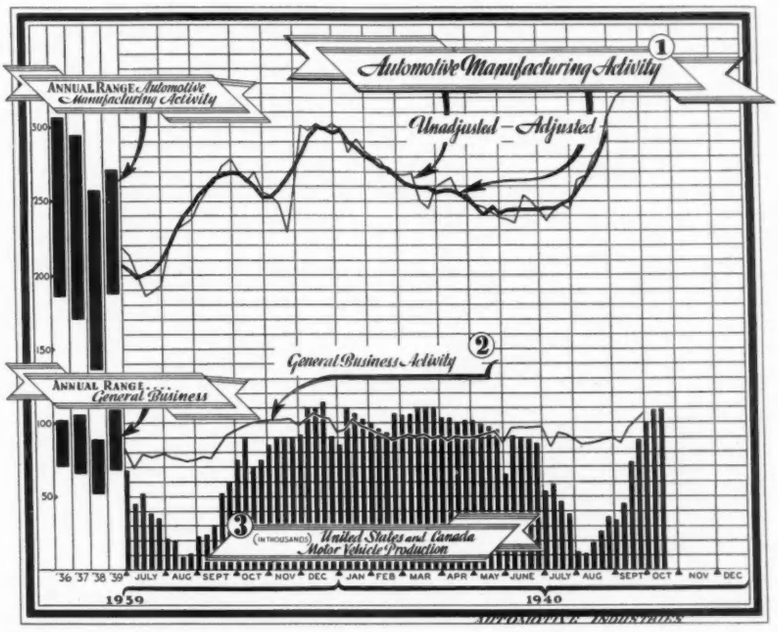
It's time for automobile shows, if they are to survive, to awake and sing. The shows are dead. Long live the shows!

The Brass Hat-Rack

"Mr. Knudsen has offered me a job at a dollar a year—and how I need that buck!"

BUSINESS IN BRIEF

Our own view of automotive production and sales; authoritative interpretation of general conditions



Weekly indexes of automotive general business charted

New October Record Likely

PROSPECTS for the biggest October production in the history of the automobile industry loomed as weekly output went over the 100,000 mark for the first three weeks of the month. Record for the month was set in 1928 when 415,820 motor cars and trucks were produced and this is almost certain to be surpassed.

Boosted by 23 working days, October's total is expected to be the biggest month of 1940 and may exceed the 469,002 units produced in December, 1939. It will far surpass the 282,040 vehicles, according to A.M.A. estimate, that were manufactured in September.

Production for the week ending Oct. 5 was estimated at 100,000 units, the highest week's output since the first week in May. General Motors stepped up its rate to 43,200 units as all its divisions neared capacity. Chrysler divisions accounted for 22,000 motor cars and trucks and Ford, not yet at peak production, turned out 18,700 vehicles. Studebaker headed the independent manufacturers, followed by Hudson, Packard, Nash and Willys, the latter just beginning final assemblies on 1941 models.

Output was expected to climb to 108,000 units for the week ending Oct. 12 and might climb slightly higher for the following week.

Production during the 1940 model year which ended in August was estimated at 4,285,000 vehicles by the A.M.A. This was composed of 3,475,000 passenger cars and 810,000 trucks, an increase of 19.5 per cent over the previous 12-month period. U. S. motor vehicle registration was estimated at 31,400,000 units at the end of the model year.

Retail new passenger car sales for September were approximately the same as for September, 1939, according to R. L. Polk & Co. on the basis of reports from 110 cities. September registrations were 27 per cent below those of August, showing the usual seasonal decline with the windup of the model year. New England showed the least decline, 22 per cent.

Three divisions of General Motors, Buick, Pontiac and Chevrolet, showed gains of 65 to 114 per cent on September deliveries, while Hudson retail sales were up 55 per cent for the first three weeks of the month.

Sales executives were inclined to agree with D. U. Bathrick, general sales manager of Pontiac, that conscription would not seriously affect retail deliveries. Mr. Bathrick pointed out that only 6 per cent of the present prospective car buyers are likely to be placed in military service by the draft and these losses probably will be offset by the increased spending attributable to the National Defense program.

AUTOMOTIVE MANUFACTURING ACTIVITY, during the week ended Sept. 21, reached the high level of 324 on the unadjusted index curve charted, herewith. In the preceding two weeks the curve continued its steady climb through the points 306 and 319. The lagging adjusted curve moved through 275, 287 and 297 during the weeks ended Aug. 24 and 31 and Sept. 7, respectively.

[1] 1923 average = 100; [2] Prepared by Administrative and Research Corp. New York. 1926 = 100; [3] Estimated at the Detroit office of AUTOMOTIVE INDUSTRIES.

Industrial Application of G

By P. M. HELDT

ASIDE from national-defense topics, which at the present time figure in the programs of practically all meetings of an industrial or engineering character, there were virtually only two subjects on the agenda of the S.A.E. tractor meeting, these being hydraulic drives and earth removal with automotive equipment. Both of these subjects are timely and important. Hydraulic transmission units for industrial application, which have become available to American industry only recently, already have aroused considerable interest because of their ability to relieve shock and thus to prolong the life of much of the power-driven machinery used in contracting and certain industrial operations; and earth removal by means of automotive equipment, while not new, has been the subject of such rapid advances in recent years that most of the textbooks on it are said to be out of date.

The meeting was again held at the Hotel Schroeder in Milwaukee, Sept. 24 and 25, and drew a large attendance. At the tractor dinner, held on the evening of the first day, 342 were seated, which was a record. The meeting is sponsored by the Tractor and Industrial Activity Committee of the S.A.E. and has been a fixture since 1933. While in past years papers on the design, equipment and use of farm tractors have predominated, as a rule, this time the industrial division of the Activity had its inning, and most of the discussion revolved around industrial applications of the internal-combustion engine.

Heavy "Off-the-Road" Haulage

H. K. Church of the Euclid Road Machinery Company gave a talk on "Heavy Automotive Haulage." He had not prepared a formal paper, but he seemed to know his subject well, and as his delivery was excellent the lack of a preprint was hardly felt. Mr. Church said he would discuss the problem of automotive haulage other than on public roads. In such operations the legal limitations on haulage on public roads do not apply. For instance, there are no restrictions on the over-all dimensions and on the axle and tire loadings. Such heavy haulage is required for the mass movement of earth, rock, and earth-rock mixtures in the construction of dams, levees, canals, harbor and river works, airports and highways, and for operations in quarries and open pits in mining coal, phosphate rock, stone, gravel, and the ores of iron, copper, lead, zinc and gold. Trucks and trailers with load capacities of from 10 to 50 tons are employed. Paraphrasing a Civil-War military maxim, the author said that in these fields success comes to him who "does the mostest work with the leastest dollars." In the past this requirement has led to a constant increase in the size of equipment. The way progress in this field often comes about is as follows: When a contractor gets one of these big trucks he puts on side boards to prevent spilling in loading with a power shovel or elevator. But when side boards are put on the body will hold a greater load, and when greater loads are carried it is found that the engine is not sufficiently powerful to handle them properly, so a larger engine is installed. With the larger engine and the greater loads the transmission may prove inadequate, hence a larger transmission has to be selected. And so the process of enlargement goes on.

"Moving earth" with a Caterpillar tractor and LeTourneau Carryall scraper on a highway project near Roanoke, Ala.

Gasoline Engines

discussed at the annual Tractor and Industrial Activity Meeting of the SAE held in Milwaukee

All trucks used in this line of work are of the "dump" type, but this type can be divided into bottom-dump, rear-dump and side-dump machines. Bottom-dump bodies are usually preferred for material that can readily be handled with them. Pictures were shown on the screen of bottom-dump trucks hauling levee dirt, iron ore and soft coal; also of so-called scrapers of the semi-automatic-loading type—big trucks which fill with earth automatically as they are being propelled forward under their own power and that of a crawler-type tractor pushing them.

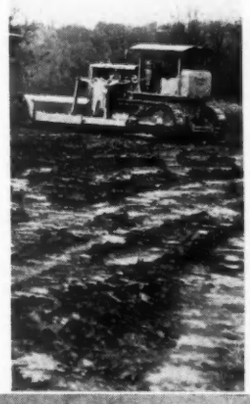
Films in colors were shown of construction operations on the Pennsylvania Turnpike (in autumn time) and on the Sepulveda Dam in California.

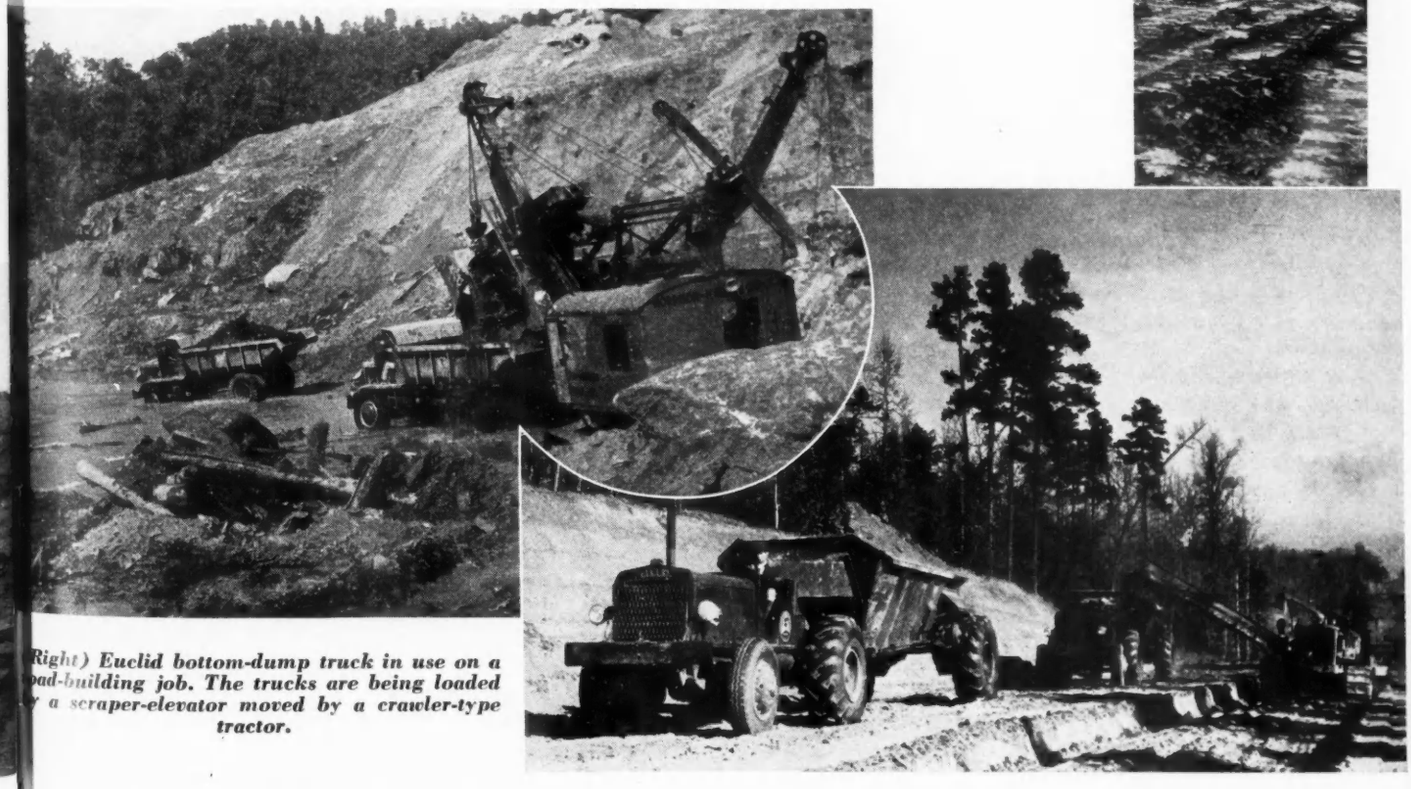
In the past, work of this kind has been accomplished by means of crawler type tractors or equipment with crawler tracks, but there is now a strong tendency toward the use of rubber tires. A special line of tires has been developed by the rubber industry for this particular class of work, in sizes up to 36 by 40 in. No doubt the chief reason for this change-over from "steel feet" to "rubber feet" (as the author put it) is the higher speeds made possible by the use of rubber tires. An indication of what the relative speeds for the two types of equipment are was given in the discussion by a tire man who said that the tire industry had adopted the practice of basing the load ratings of tires for equipment completely rubber-tired on

(*Turn to page* 453, *please*)

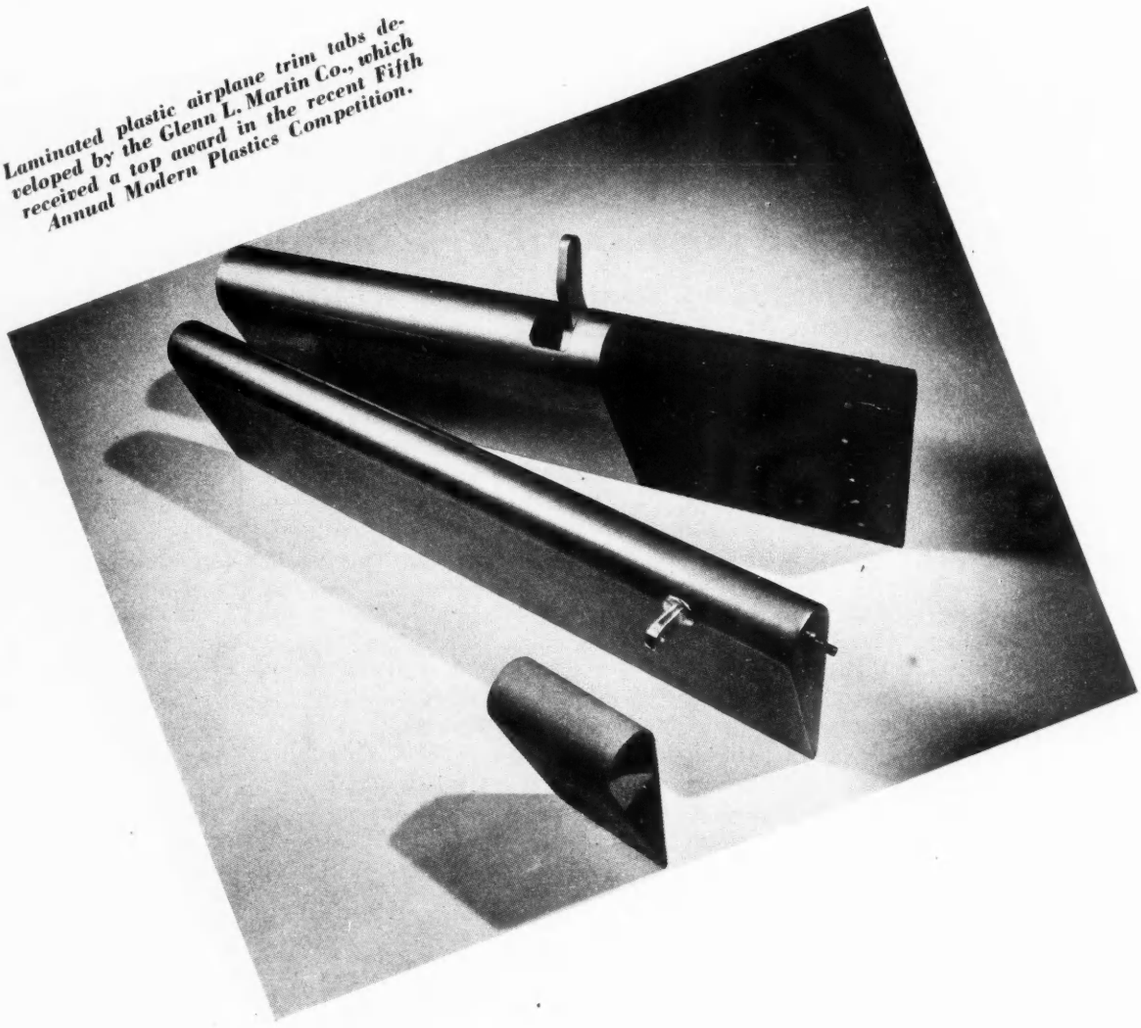
(Right) Caterpillar Diesel tractor operating a bulldozer.

(Below at Left) Euclid rear-dump truck in use in open-pit mining. The trucks are being loaded by power shovels.





(Right) Euclid bottom-dump truck in use on a road-building job. The trucks are being loaded by a scraper-elevator moved by a crawler-type tractor.



Laminated plastic airplane trim tabs developed by the Glenn L. Martin Co., which received a top award in the recent Fifth Annual Modern Plastics Competition.

Automotive MATERIALS

44

Plastic Trim Tabs For Airplanes Win Award

LAMINATED plastic airplane trim tabs developed by the Glenn L. Martin Co., Baltimore, Md., in conjunction with the Formica Insulation Co., Cincinnati, Ohio, and the Taylor Fibre Co., Norristown, Pa., won an award in the Transport Group of the Fifth Annual Modern Plastics Competition sponsored recently by *Modern Plastics*. Basic purpose of the trim tabs is to relieve the pilot of unnecessary forces on the normal flight controls.

Designed for use on ailerons, elevators, and rudders, these plastic tabs are to be used in place of metal or fabric parts. The laminated phenolic fabric base structure weighs appreciably less than aluminum and on strength tests has far exceeded specifications established for metallic tabs. Resiliency of the laminated structure causes the tab to keep its shape under stress where metal parts often are permanently distorted. The smooth uninterrupted surface of the plastic tab offers many advantages over a metal tab having projecting rivet heads or overlapping seams. Moisture does not affect the material and it is not subject to corrosion.

The use of plastics eliminates many operations formerly necessary when metal was employed. For instance, the outer skin and longitudinal interior support are fabricated in one piece by a single application of heat and externally applied pressure. Formerly, it was necessary to cut the metal, bend it to form and hold it together by rivets.

Tests prove that the laminated tab possesses a greater resistance to buckling than metal and 25 per

cent to 35 per cent more resistance to bending. These tabs have withstood twice the required hours on the vibration tests as compared to a metal piece of similar outside dimensions.

Another award in the Transportation Group of the Modern Plastics Competition was made for an automobile instrument panel injection molded of Tenite II, used on 1941 Chrysler cars.

Bethlehem Offers A New Tool Steel

A HIGH-CARBON, high-vanadium tool steel suitable for a wide variety of uses, ranging from heavy hogging cuts to fine finishing operations, has been developed by the Bethlehem Steel Co., Bethlehem, Pa. The new steel, marketed under the name "Red Tiger," represents a departure from standard practice in that the carbon content has been increased appreciably to give extra hardness, an average Rockwell of 65 C to 68 C after heat treatment. This is said to have been attained without excessive brittleness. Physical tests show impact properties which are approximately the same as those of standard carbon 18:4:1 high-speed steel.

The manufacturer points out that the shock resisting properties make it possible to use this steel on intermittent cuts without danger of breaking the tool. Due to the high carbon content, the steel also lends itself well to fine finishing operations, producing a surface comparable with that obtainable with the old type finishing steels which can be run only at low speed. Good red hardness values make it suitable for heavy hogging cuts.

The analysis of the new steel is, approximately, as follows: tungsten, 18 per cent; chromium, 4 per cent; vanadium, 2.5 per cent; molybdenum, 0.60 to 0.80 per cent; carbon, 1 per cent. Standard heat treatment, without extra precautions, is used. The following is the recommended treatment: Preheat the steel slowly to between 1500 and 1650 deg. Fahr. and soak thoroughly. Transfer to the hardening furnace, heat rapidly to between 2350 to 2375 deg. Fahr. and oil-quench immediately to about 200 deg. Fahr. Allow to cool to room temperature, charge into a tempering furnace and draw to 1050 deg. Fahr. If properly followed, it is said that this hardening procedure will give a Rockwell hardness between 65 C and 68 C.

Red Tiger high-speed steel is supplied in bar stock, heat-treated tool bits (furnished in ground condition only) and turning plugs used with special tool holders.

National Cotton Council Announces New Tire Cord

A NEW cotton tire cord with what is claimed to be a "300 per cent longer flexing life than the best conventional cord of the same gage size" has been announced by the National Cotton Council. Laboratory findings, which have been confirmed by indoor tire tests plus actual road tests conducted in collaboration with the Firestone Tire & Rubber Co., are reported to show that in addition to its flexing properties the new cord has a 35 per cent higher breaking strength than the best conventional cord, and very low sensitivity to both heat and moisture.

The Cotton Research Foundation, research agency of the Council whose object is to promote the use of cotton, has revealed that through patent rights the new cord-making process will be made available to the whole tire industry. Revenues gained from royalties will be used to defray further research expense.

The new procedures are the result of three years of research conducted by Dr. R. F. Nickerson at the Mellon Institute in Pittsburgh, Pa., under the auspices of the National Cotton Council and its research affiliate.

Electroplating Colalloy, Aluminum and Its Alloys

THE COLONIAL ALLOYS CO., Philadelphia, Pa., chemicals division, has developed what it describes as a low cost, easy method of commercially electroplating Colalloy, aluminum and aluminum alloys. The process consists of a two to four minute dip into a solution known as "Pre-Plate," which is furnished by the company. There is no electrolytic preparation necessary, and the chemical solution is used at room temperature. After this dip, the product is ready for the regular plating bath. No special tanks or equipment are required. The size of the work is not a limiting factor.

Difficulties have been experienced by many firms in electroplating aluminum base metals due to the instant forming of oxide on the surface of the metal. Various methods, from chemically etching the base metal to building up the oxide, have been tried and apparently are not completely satisfactory.

When the "Pre-Plate" method for electroplating Colalloy, aluminum and its alloys is used, it is claimed that there is no difficulty with the oxide coat and that the bond is efficient and strong. Pre-Plate lends itself to direct plating of metals, such as gold, silver, copper, cadmium,

Developments in plastics, tool steel, a new tire cord, aluminum plating and synthetic rubber come into this month's limelight

and the other alkaline plating baths on the aluminum base metals. Nickel, chromium and other metals are plated over copper, after Pre-Plating.

Nozzle for Gasoline Hose Made of Synthetic Rubber

A SYNTHETIC rubber flexible nozzle for gasoline hose was placed on the market recently by the B. F. Goodrich Co., Akron, Ohio. It is so constructed that it discharges static electricity by providing a ground and thus prevents any dangerous sparks, a factor which has been an obstacle to the use of natural rubber for this service because rubber has been looked upon as an insulator and not a conductor. The new nozzle has passed the tests of the Underwriters Laboratories, Inc., research organization for the National Board of Fire Underwriters.

The ability of the nozzle to discharge static electricity is due to the conductivity of the synthetic rubber composition and the imbedding of spiral brass wires spaced equally around the nozzle in four of 16 semi-circular stiffening ribs built on the surface, with the outer surface of the wire flush with the surface of the ribs. These wires extend under the metal coupling of the nozzle and make contact with it for discharge of the static through the hose. The wires are flexible and do not interfere with manipulation of the nozzle.

A New duPont Anti-Freeze

DEVELOPMENT of a high-boiling anti-freeze, based on ethylene glycol, from the raw materials coal, air and water, has been announced by E. I. du Pont de Nemours & Co. Zerex, trade-name of the new product, will be introduced as a companion product to Zerone, a methanol type anti-rust anti-freeze made by du Pont.

Synthetic Rubber for Protective Clothing

PROTECTIVE clothing for industrial workers is being made from a new synthetic rubber compound, trade-named Synthal, by the United States Rubber Co. Synthal resists oils, greases, acids, alkalies and chemicals, and is strongly resistant to other enemies of natural rubber, such as heat, sunlight and aging.

Complete imperviousness for the garments is attained through the use of a new "curing cement." All seams of the garments are sealed with this cement, thereby eliminating stitch holes that could provide a means of penetration.

Garments made of the new synthetic rubber will cost upwards of twice as much as those made of natural rubber but will provide longer life in addition to other advantages. Clothing articles already made of Synthal include coats, jackets, overalls, aprons, leggings, sleeves, hats, boots and overshoes.

Preparing Aluminum Castings For Finishing Process

HINTS on preparing the surfaces of aluminum castings for the finishing process—anodizing, plating, painting or varnishing—are given in a pamphlet recently issued by Aluminum Union, Ltd., London. The first roughing operations are usually carried out with silicon-carbide wheels of 24-50 grit, operating at peripheral speeds ranging from 1500 to 4000 f.p.m. Wheels of open texture are always used, to prevent glazing, and the preference is for dry grinding.

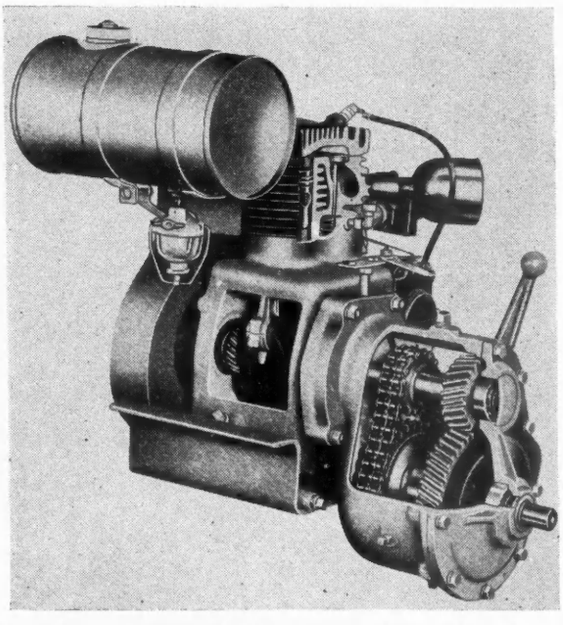
The first polishing operation is usually carried out on wooden wheels faced with canvas or leather, or on wheels built up of canvas discs glued together. Wheels may vary in diameter from six to 20 in. and in face width from 1.5 to 4 in. They operate at peripheral speeds of 5000 f.p.m. and the abrasive employed is emery or fused alumina, Nos. 60-100. As in the first grinding operation, care must be taken to avoid undue heating of the metal, and a lubricant consisting of tallow thinned down with lard oil is sometimes employed.

The next stage of the preparatory process is usually referred to as "greasing" and is carried out on felt or sheepskin wheels faced with Nos. 100-200 emery and operating at a surface speed of 5000 f.p.m. A lubricant is always used; it generally consists of tallow or beeswax mixed with oil. The buffing operation, which is undertaken next, is carried out by means of stitched wheels operating at 7000 f.p.m. surface speed, the wheels being treated, as a rule, with tripoli in a hard-grease base. The final polishing is done on soft, open muslin or flannel wheels running at 8000 to 10,000 f.p.m. and treated with a slow-cutting silica abrasive in a grease base.

Gear for Marine Engine

Wisconsin Motor Corporation has brought out a combined reversing and reduction gear for use with its small air-cooled inboard marine engines, as illustrated herewith.

As clearly shown by the cut-away view, the forward drive is through a chain and the reverse drive through helical gears, the reduction ratio in each case being 2:1. The driver sprocket and gear are of nickel iron, while the driven sprocket and gear are of steel. Ball bearings and taper roller bearings are used throughout.



Wisconsin small air-cooled inboard marine engine with combined reverse and reduction gear.

1941 Motor Car Specifications

Price, Weight and Body Data

Following are delivered prices at factory for cars with standard equipment and include all federal taxes with exception of Buick, Ford, Lincoln-Zephyr, Mercury and Willys. Optional equipment, state or local taxes, transportation charges and finance charges are extra.

BODY, MAKE AND MODEL	Delivered Price	Shipping Weight
BANTAM		
Mast. Coupe, 2p.	449	1271
Mast. Road., 2p.	449	1211
Pickup Truck	475	1256
Panel Truck	489	1331
Conv. Coupe, 2p.	525	
Conv. Sedan, 4p.	549	1296
Sta. Wagon, 4p.	575	1411
BUICK		
Special 41-40		
Bus. Coupe, 2p.	935	3630
Sedan, 2d.	1006	3700
Tour. Sedan, 4d.	1052	3730
SE 41-40		
Sedan, 2d	1063	
Tour. Sedan, 4d.	1163	
Estate Wagon	1360	
Super 41-50		
Bus. Coupe	1031	3620
Sport Coupe	1113	3670
Tour. Sedan, 4d.	1185	3770
Conv. Coupe	1267	3810
Conv. Phae., 4d.	1555	3990
Century 60		
Bus. Coupe	1195	3870
Sedan, 2d	1241	3920
Tour. Sedan, 4d.	1288	4025
Roadmaster 41-70		
Sport Coupe	1262	3920
Tour. Sedan, 4d.	1364	4010
Conv. Coupe	1457	4345
Conv. Phae., 4d.	1775	4245
Limited 41-90		
Tour. Sedan, 6p.	2155	
Tour. Sedan, 8p.	2360	
Limousine	2465	
Formal Sed., 6p.	2310	
CADILLAC		
Series 61		
Coupe, 5p	1345	
DeL. Coupe, 5p.	1435	
Tour. Sedan, 5p.	1445	
DeL. Tour. Sed.	1535	
Series 62		
Coupe, 2-4p	1420	
Tour. Sedan	1495	
DeL. Cpe., 2-4p	1510	
DeL. Tr. Sed.	1535	
DeL. Conv. Cpe.	1645	
DeL. Conv. Sed.	1965	
Series 63		
Tour. Sedan, 5p.	1695	
Series 60S		
Tour. Sedan, 5p.	2195	
Tr. Sed. Div., 5p	2345	
Series 67		
Tour. Sedan, 5p.	2595	
Tour. Sedan, 7p.	2735	
Tr. Sed. Div., 5p	2745	
Tr. Imperial, 7p.	2890	
Series 75		
Bus. Sedan, 9p.	2895	
Tour. Sedan, 5p.	2995	
Bus. Imperial, 9p	3050	
Tour. Sedan, 7p.	3140	
Tr. Sed. Div., 5p	3150	
Tr. Imperial, 7p	3295	
Formal Sedan, 5p	3920	
CHEVROLET		
Master DeL.		
Bus. Coupe	725	3020
Coupe, 5p	756	
Town Sedan, 5p	767	3050
Sport Sedan, 5p.	809	
Cabriolet, 5p		
Special DeL.		
Bus. Coupe	777	3030
Coupe, 5p	808	3050
Town Sedan, 5p.	818	3095
Sport Sedan, 5p.	859	3140
Cabriolet, 5p	957	
Stat. Wagon, 8p		
CHRYSLER		
Windsor		
Coupe, 3p	945	3215
Brougham, 6p	1021	3305
Sedan, 4d., 6p	1051	3335
Town Sedan, 6p.	1111	
Club Coupe, 5p.	1041	3295
Sedan, 7p		
Limousine, 7p		
Royal		
Coupe, 3p	998	3215
Sedan, 2d., 6p	1075	3305
Sedan, 4d., 6p	1125	3335
Club Coupe, 5p.	1096	3295
Town Sedan, 6p.	1175	3350
Sedan, 7p		
Limousine, 7p		
New Yorker, C-30-N		
Coupe, 3p	1195	3670
Brougham, 6p	1248	3780
Sedan, 4d., 6p	1278	3805
Town Sedan, 6p.	1328	3835
Club Coupe, 5p.	1266	
Traveler C-30-K		
Coupe, 3p	1275	3670
Brougham, 6p	1325	3780
Sedan, 4d., 6p	1345	3805
Club Coupe, 5p.	1335	
Town Sedan	1375	3835
Crown Imp. C-33		
Sedan		
Sedan, 8p		
Limousine		
Town Sedan		
CROSLEY		
Coupe, 2p	315	950
Std. Sedan, 4p	366	975
DeL. Sedan, 4p	376	975
Pkw. Delivery	390	1030
Pick. Delivery	400	1100
Cov. Wag., 2p	402	1075
Cov. Wag., 4p	417	1100
Panel Delivery	451	1100
Sta. Wag., 2p	454	1135
Sta. Wag., 4p	470	1160
DE SOTO		
De Luxe		
Coupe, 3p	898	
Sedan, 2d., 3p	965	
Sedan, 4d., 6p	995	
Sedan, 7p		
Club Coupe, 5p.	985	
Custom		
Coupe, 3p	945	
C. Cib. Cpe., 5p		
Brougham, 6p	1020	
Sedan, 4d., 6p	1045	
Town Sedan, 6p.	1095	
Club Coupe, 5p.	1035	
Sedan, 7p		
Limousine, 7p		
DODGE		
DeLuxe		
Coupe	825	3028
Sedan, 2d., 6p	880	3093
Sedan, 4d., 6p	920	
Custom		
Broug., 2d., 6p	925	3156
Club Coupe, 6p.	960	3156
Sedan, 2d., 6p	965	3191
Town Sedan, 6p.	995	3226
Sedan, 7p		
Limousine, 7p		
FORD		
DeLuxe—85		
Coupe, w.f.s.	695	
Coupe, f.s.		
Tudor Sedan	735	
Fordor Sedan	775	
Station Wagon		
Super DeLuxe—85		
Coupe, w.f.s.	740	
Coupe, f.s.		
Tudor Sedan	730	
Fordor Sedan	820	
Sedan Coupe	810	
Conv. Club Cpe.	905	
Station Wagon		
HUDSON		
Traveler—10		
Coupe, 3p	772	2790
Sedan, 2d., 6p	772	2850
Club Coupe, 6p.	795	2840
Sedan, 4d., 6p	800	2903
DeLuxe—10		
Coupe, 3p	810	2840
Sedan, 2d., 6p	831	2900
Club Coupe, 6p.	857	2895
Sedan, 4d., 6p	865	2950
Convertible, 6p.	1070	
Super Six—11		
Coupe, 3p	887	2935
Sedan, 2d., 6p	907	3000
Club Coupe, 6p.	942	2980
Sedan, 4d., 6p	938	3050
Convertible, 6p.	1160	
Commodore Six—12		
Coupe, 3p	959	
Sedan, 2d., 6p	990	3050
Club Coupe, 6p.	1021	3045
Sedan, 4d., 6p	1018	3100
Convertible	1226	
Commodore 8—14		
Coupe, 3p	1002	3135
Sedan, 2d., 6p	1027	3210
Club Coupe, 6p.	1064	3210
Sedan, 4d., 6p	1063	3260
Convertible, 6p.	1276	
Commodore Cust. 8—15		
Coupe, 3p	1088	
Club Coupe, 6p.	1151	3235
Commodore Cust. 8—17		
Sedan, 4d., 6p	1251	3400
Sedan, 4d., 8p		
Big Boy—18		
Carryall, 8p		
Sedan, 8p		
LINCOLN-ZEPHYR		
Coupe, 3p		
Sedan, 6p		
Club Coupe, 6p		
Conv. Coupe, 6p		
LINCOLN-CONTINENTAL		
Cabriolet, 6p		
Coupe, 6p		
LINCOLN-CUSTOM		
Sedan, 8p		
Limousine, 8p		
MERCURY		
Coupe, w.f.s.	885	
Coupe, f.s.		
Sedan, 2d	920	
Town Sedan	960	
Sedan Coupe	950	
Club. Conv.	1070	
Station Wagon	1110	
NASH		
Ambassador Special 600		
Business Coupe	731	
Sedan, 4d	780	
DeLuxe 600		
Business Coupe	783	
Brougham, 2d	810	
Sed., DeL., 4d	810	
Sedan, trk., 4d	860	2530
Ambassador 6		
Business Coupe	923	
Sed., Spl., 4d	930	
Brougham, 2d	973	
Sed., DeL., 4d	930	
Sedan, trk., 4d	1030	3390
Ambassador 8		
Sed., Spl., 4d	1050	
Brougham, 2d	1081	
Sed., DeL., 4d	1101	
Sedan, trk., 4d	1151	3475
OLDSMOBILE		
Special Six		
Bus. Coupe, 3p	852	
Club Coupe, 3-6p	893	
Sedan, 2d., 6p	898	3190
Sedar, 4d., 6p	945	3230
Conv. Cpe., 3-6p	1048	
Station Wagon	1104	
Dynamic Six		
Club Sedan, 6p.	954	3325
Sedan, 4d., 6p.	1010	3390
Custom Six		
Club Coupe, 3-6p	1043	3320
Sedan, 4d., 6p.	1099	3410
Conv. Cpe., 3-6p	1191	
Special Eight		
Club Coupe, 3-6p	935	
Sedan, 4d., 6p.	987	3360
Conv. Cpe., 3-6p	1089	
Dynamic Eight		
Club Sedan, 6p.	989	3420
Sedan, 4d., 6p.	1045	3500
Custom Eight		
Club Coupe, 3-6p	1079	3430
Sedan, 4d, 6p	1135	3500
Conv. Cpe., 3-6p	1227	3620
Conv. Phae., 6p	1575	
PACKARD		
One Ten		
Bus. Coupe, 2p	907	3150
Club Cpe., 2-4p	1000	3200
Tr. Sed., 2d., 5p	1024	3245
D. Cb. Cpe., 2-4p	1038	3205
Tr. Sed., 4d., 5p	1056	3250
D. T. Sd., 2d., 5p	1084	3270
D. T. Sd., 4d., 5p	1116	3270
Conv. Cpe., 2-4p	1175	3310
D. C. Cpe., 2-4p	1209	3315
Stat. Wag., 8p.	1231	3460
D. Sta. Wag., 6p	1291	3470
One Twenty		
Bus. Cpe., 2p	1112	3385
Club Cpe., 2-4p	1205	3430
Tr. Sed., 2d., 5p	1230	3504
Tr. Sed., 4d., 5p	1261	3510
Conv. Cpe., 2-4p	1377	3585
Sta. Wagon, 8p	1436	3720
D. Sta. Wag., 8p	1496	3730
Conv. Sedan, 5p	1723	3725
Super Eight One Sixty—		
1903		
Bus. Coupe, 2p	1894	3675
Club Coupe, 2-4p	1709	3800
Tr. Sed., 4d., 5p	1750	3865
Conve. Cpe. 2-4p	1892	3965
D. C. Cpe., 2-4p	2067	3985
Conv. Sedan, 5p	2180	4140
D. Conv. Sed., 5p	2405	4160
1904		
Tr. Sed., 4d., 5p	2009	4305
1905		
Tour. Sedan, 7p.	2161	4495
Limousine	2289	4570
One Eighty—		
1906		
Conv. Vict., 5p.	4550	4040
1907		
Tr. Sed., 4d., 5p	2587	4350
Formal Sed., 5p	3045	4380
Brougham, 5p.	3500	4450
Cabriolet	4650	4075
Sport Sedan, 5p.	4750	4490
1908		
Tour. Sedan, 7p.	2724	4590
Tr. Lim., 7p	2868	4650
Town Car	4775	4200
Tr. Sd., LeB., 7p	5300	4740
Tr. Lim., LeB., 7p	5550	4850
PLYMOUTH		
Coupe, 2p.	685	2806
Sedan, 2d., 5p.	739	2859
Sedan, 4d., 5p.	780	2989
Utility Sed., 2d.	739	
DeLuxe		
Coupe, 2p.	729	2839
Sedan, 2d., 5p.	779	2899
Sedan, 4d., 5p.	820	2924
Special DeL.		
Coupe, 2p	760	2866
Coupe, 2-4p	805	2936
Sedan, 2d., 5p.	810	2941
Sedan, 4d., 5p.	840	2956
Conv. Cpe., 2-4p	970	3166
Sedan, 7p	1045	
Limousine, 7p		
Station Wagon	995	
PONTIAC		
DeLuxe Six		
Business Coupe	828	
Sedan Coupe	864	
Tour. Sedan, 2d.	874	
Tour. Sedan, 4d.	921	
Conv. Coupe	1023	
PONTIAC (Continued)		
Streamliner Six		
Sedan Coupe	923	
Sedan, 4d	980	
Sup. Sed. Cpe.		
Sup. Sed., 4d		
Custom Six		
Sedan Coupe		
Tour. Sed., 4d.		
DeL. Eight		
Business Coupe	853	
Sedan Coupe	889	
Tour. Sedan, 2d.	899	
Tour. Sedan, 4d.	946	
Conv. Coupe	1049	
Streamliner Eight		
Sedan Coupe	948	
Sedan, 4d	1005	
Sup. Sed. Cpe.		
Sup. Sed., 4d		
Custom Eight		
Sedan Coupe	1020	
Tour. Sedan, 4d.	1077	
STUDEBAKER		
Champion Custom		
Coupe	690	
Coupe, 5p	725	
Club Sedan	730	
Cruis. Sedan	770	
DeLuxe		
Coupe	720	
Coupe, 5p	755	
Club Sedan	760	
Cruis. Sedan	800	
DeLux-Tone		
Coupe	755	
Coupe, 5p	790	
Club Sedan	795	
Cruis. Sedan	835	
Commander 6 Custom		
Cruis. Sedan	985	
Land Cruiser	1030	
DeLux-Tone		
Cruis. Sedan	1050	
Land Cruiser	1095	
President 8 Custom		
Cruis. Sedan	1115	
Land Cruiser	1160	
DeLux-Tone		
Cruis. Sedan	1180	
Land Cruiser	1225	
WILLYS-AMERICAR		
Coupe		2370
Sedan		
Station Wagon		

SPECIFICATIONS

General and Engine Specifications

Line Numbers	PASSENGER CAR MAKE AND MODEL	Wheelbase (In.)	Tread (In.) Front	Tread (In.) Rear	Overall Length with Bumper (In.)	Shipping Weight (Lb.) Cheapest 5 Pass., 4 door Sedan or equivalent	Tire Size (In.)	Gear Ratio 5 Pass., 4 door Sedan	ENGINE: No. of Cylinders, Bore and Stroke (In.)	Valve Arrangement	Cylinder Arrangement	Cylinder Head Material	Piston Displacement (Cu. In.)	Taxable Horsepower	Maximum Brake Hp. at Specified R.P.M.	Maximum Torque (Lb. Ft.) at Specified R.P.M.	Compression Ratio (to 1) Standard	Compression Ratio (to 1) Optional	Compression Pressure: Pressure (Lb.)	Compression Pressure: At What R.P.M.	Weight per Cu. In. 5 Pass., 4 door Sedan *	Weight per Hp. 5 Pass., 4 door Sedan *	Hp. per Cu. In.	Crankshaft Revolutions per Mile †	Displacement Factor ††	Line Numbers
1	Bantam 65	75	39 1/32	42 1/2	129 1/2	1309	4.00/15	5.25	4-2.26x3.12	L	IL	CI	50.14	8.2	22-3800	35-1800	7.40	No	135	200	30.89	70.45	.44	4735		1
2	Buick-Special 41-40	121	58 1/16	61 1/2	200 3/4	3730	6.50/16	4.40	8-3 1/8 x4 1/8	I	IL	CI	248.0	30.6	115-3500	210-2000	6.50	.....	142	1000	17.00	36.80	.46	3203	36.4	2
3	Buick-Super 41-50	121	58 1/16	61 1/2	210 3/8	3770	6.50/16	4.10	8-3 1/8 x4 1/8	I	IL	CI	248.0	30.6	125-3800	217-2000	7.00	.....	148	1000	17.20	34.10	.50	2935	33.6	3
4	Buick-Century 41-60	126	59 1/16	62 3/16	213 1/2	4025	7.00/15	3.90	8-3 7/16 x4 5/16	I	IL	CI	320.2	37.8	165-3800	278-2200	7.00	.....	151	1000	14.10	27.40	.52	2843	39.0	4
5	Buick-Roadmaster 41-70	126	59 1/16	62 3/16	215 1/2	4010	7.00/15	3.90	8-3 7/16 x4 5/16	I	IL	CI	320.2	37.8	165-3800	278-2200	7.00	.....	151	1000	14.10	27.40	.52	2843	39.1	5
6	Buick-Limited 41-90	139	58 1/32	62 1/2	228 5/8	.....	7.50/16	4.18	8-3 7/16 x4 5/16	I	IL	CI	320.2	37.8	165-3800	278-2200	7.00	.....	151	1000	.....	.....	.52	2842	.....	6
7	Cadillac-V8 61, 62, 63, 60S	126	59	63	(m)	.....	7.00/15	3.77	8-3 1/2 x4 1/2	L	V	CI	346.0	39.2	150-3400	283-1700	7.25	.....	182	1000	.....	.....	.43	2748	.....	7
8	Cadillac-V8 67, 75	139-136	58 1/2	62 1/2	(n)	.....	7.50/16	4.27	8-3 1/2 x4 1/2	L	V	CI	346.0	39.2	150-3400	283-1700	7.25	.....	182	1000	.....	.....	.43	2904	.....	8
9	Chevrolet-Spec. DeL. & Mas. DeL.	116	57 3/8	60	195 3/4	3140	6.00/16	4.11	6-3 1/16 x3 3/4	I	IL	CI	216.5	29.4	90-3300	174-.....	6.50	No	.....	.....	16.81	40.40	.41	3066	35.2	9
10	Chrys.-Roy. & Windsor C-28	121 1/2	57	60 3/32	211 1/32	3335	6.25/16	3.90	6-3 9/16 x4 1/2	L	IL	CI°	241.5	27.3	112-3600	-1200	6.80	7.20	145	1000	15.85	34.25	.46	2878	35.1	10
11	Chrysler-New Yorker. C30N, 30K	127 1/2	57 27/32	61 1/16	217 1/32	3805	7.00/15	3.91	8-3 1/4 x4 7/8	L	IL	CI	323.5	33.8	137-3400	255-1600	6.80	.....	155	1000	13.32	31.43	.42	2850	41.5	11
12	Chrysler-Crown Imperial C33	145 1/2	57 27/32	61 7/8	231 3/16	.....	7.50/15	4.55	8-3 1/4 x4 7/8	L	IL	AI	323.5	33.8	140-3400	260-1600	6.80	.....	155	1000	.....	.....	.....	3267	.....	12
13	Crosley CB-41	80	40	40	120	975	4.25/12	5.14	2-3x2 1/2	L	IL	CI	35.3	7.2	12-4000	20-2800	5.60	No	80	240	41.80	123.00	.31	5191	.....	13
14	De Soto-DeLuxe & Custom S-8	121 1/2	57	60 3/32	207 3/4	3254	6.25/16	4.10	6-3 3/8 x4 1/4	L	IL	CI°	228.1	27.3	105-3600	178-1200	6.60	7.20	150	1000	14.21	30.90	.46	3026	35.5	14
15	Dodge-DeLuxe & Custom D-19	119 1/2	57	60 3/32	202 1/16	.....	6.00/16	4.30	6-3 1/4 x4 3/8	L	IL	CI	217.8	25.3	91-3800	170-1200	6.50	.....	.....	.....	.....	.....	.42	3208	.....	15
16	Ford-DeLuxe & Super DeLuxe	114	55 3/4	58 1/4	194.34	.....	6.00/16	3.78	8-3.062x3.75	L	V	CI	221.0	30.0	85-3800	157-2200	6.15	No	140	2400	.....	.....	.38	2810	.....	16
17	Hudson-DeLuxe & Traveler 6 10	116	56 5/16	59 1/2	196 3/32	(c)	(d)	4.55	6-3x4 1/8	L	IL	CI	175.0	21.6	92-4000	138-1400	7.25	No	125	125	(p)	(r)	.52	3508	34.8	17
18	Hudson-Super & Comm. 6 11-12	121	56 5/16	59 1/2	201 3/32	(e)	(f)	4.11	6-3x5	L	IL	CI	212.0	21.6	102-4000	168-1200	6.50	No	120	125	(t)	(u)	.46	3066	35.4	18
19	Hudson-Commodore 8 14	121	56 5/8	59 1/2	201 3/32	3260	6.25/16	4.11	8-3x4 1/2	L	IL	CI	254.0	28.8	128-4200	198-1600	6.50	No	119	125	14.80	29.3	.50	3033	39.6	19
20	Hudson-Comm. Custom 8 17	128	56 5/16	59 1/2	208 5/8	3400	6.50/16	4.11	8-3x4 1/2	L	IL	CI	254.0	28.8	128-4200	198-1600	6.50	No	119	125	14.96	29.7	.50	2992	.....	20
21	Lincoln-Zephyr & Continental	125	55 3/4	60	209.82	.....	7.00/16	4.44	12-2.875x3.75	L	V	CI	292.0	39.6	120-3500	.....	7.00	No	.....	.....	.....	.....	.41	3135	.....	21
22	Lincoln-Custom	138	.....	60	225.25	.....	7.00/16	4.44	12-2.875x3.75	L	V	CI	292.0	39.6	120-3500	.....	7.00	No	.....	.....	.....	.....	.41	3135	.....	22
23	Mercury	118	55 3/4	58 1/4	200.16	.....	6.50/16	3.54	8-3.187x3.75	L	V	CI	239.0	32.5	95-3800	176-2100	6.15	No	145	2200	.....	.....	.40	3135	.....	23
24	Nash-Ambassador 600 4140	112	56	59 3/4	194	2550	5.50/16	4.11	6-3 1/16 x3 3/4	L	IL	CI	172.6	23.4	75-3600	136-1200	6.70	No	120	350	17.66	40.63	.43	3169	33.4	24
25	Nash-Ambassador 6 4160	121	57 1/2	60 1/2	200.75	3350	6.25/16	4.10	6-3 3/8 x4 3/8	I	IL	CI	234.8	27.3	105-3400	195-1600	6.30	No	125	350	16.40	36.70	.40	3026	35.6	25
26	Nash-Ambassador 8 4180	121	57	61 1/4	200.75	3450	6.50/16	4.10	8-3 1/8 x4 1/4	I	IL	CI	260.8	31.2	115-3400	200-1600	6.30	No	110	350	15.18	34.30	.44	2992	38.2	26
27	Oldsmobile-Special 6	119	58	61 1/2	204	3230	6.00/16	4.10	6-3 1/16 x4 1/16	L	IL	CI	238.1	29.4	100-3400	190-1400	6.20	5.74	115	100	15.67	37.30	.42	3059	37.7	27
28	Oldsmobile-Dynamic 6	125	58	61 1/2	211	3390	6.50/16	4.30	6-3 1/16 x4 1/16	L	IL	CI	238.1	29.4	100-3400	190-1400	6.10	5.74	115	100	16.32	38.90	.42	3130	37.2	28
29	Oldsmobile-Custom 6	125	58	61 1/2	213	3410	7.00/15	4.30	6-3 1/16 x4 1/16	L	IL	CI	238.1	29.4	100-3400	190-1400	6.10	5.74	115	100	16.40	39.10	.42	3135	37.0	29
30	Oldsmobile-Special 8	119	58	61 1/2	204	3360	6.50/16	4.10	8-3 1/4 x3 7/8	L	IL	CI	257.1	33.8	110-3600	200-2000	6.30	5.70	107	100	15.00	35.10	.43	2985	38.4	30
31	Oldsmobile-Dynamic 8	125	58	61 1/2	211	3500	6.50/16	4.30	8-3 1/4 x3 7/8	L	IL	CI	257.1	33.8	110-3600	200-2000	6.30	5.70	107	100	15.56	36.40	.43	3130	39.0	31
32	Oldsmobile-Custom 8	125	58	61 1/2	213	3500	7.00/15	4.30	8-3 1/4 x3 7/8	L	IL	CI	257.1	33.8	110-3600	200-2000	6.30	5.70	107	100	15.56	36.40	.43	3135	39.0	32
33	Packard-One Ten 1900	122	59 9/16	60 5/8	201 1/16	3250	6.50/15	4.30	6-3 1/16 x4 1/4	L	IL	CI	245.0	29.4	100-3600	.....	6.39	6.71	.....	.....	15.30	37.50	.41	3130	.....	33
34	Packard-One Twenty 1901	127	.....	.....	50 9/16	206 3/4	3510	7.00/15	4.09	8-3 1/4 x4 1/4	L	IL	CI	282.0	33.8	120-3600	.....	6.41	6.85	.....	.....	14.20	33.40	.43	2982	40.6	34
35	Packard-Super Eight 1903-4-5	127-38-48	59 9/16	(h)	(i)	3865	7.00/16	(g)	8-3 1/2 x4 5/8	L	IL	CI	356.0	39.2	160-3600	.....	6.45	6.85	.....	.....	12.23	27.25	.45	2768	43.8	35
36	Packard-Cus. Sup. Eight 1906-7-8	127-38-48	59 9/16	(h)	(k)	4040	7.00/16	(g)	8-3 1/2 x4 5/8	L	IL	CI	356.0	39.2	160-3600	.....	6.45	6.85	.....	.....	12.72	28.30	.....	2887	43.8	36
37	Plymouth P-11	117	57	59 1/32	194 3/4	2889	6.00/16	4.10	6-3 1/16 x4 3/16	L	IL	CI	201.3	23.4	87-3800	160-1200	6.70	.....	.....	.....	16.87	39.00	.43	3059	35.1	37
38	Plymouth-Special DeLuxe P-12	117	57	59 1/32	197 1/2	2956	6.00/16	4.30	6-3 1/16 x4 3/16	L	IL	CI	201.3	23.4	87-3000	160-1200	6.70	.....	.....	.....	17.20	39.70	.43	3278	36.1	38
39	Pontiac-DeLuxe 6 41-25	119	58	61 1/2	201 1/2	.....	6.00/16	4.10	6-3 7/16 x4	L	IL	CI	239.2	30.4	90-3200	175-1400	6.50	7.50	155	1000	.....	.....	.38	3059	.....	39
40	Pontiac-Streamliner 6 41-26	122	58	61 1/2	207 1/2	.....	6.50/16	4.30	6-3 7/16 x4	L	IL	CI	239.2	30.4	90-3200	175-1400	6.50	7.50	155	1000	.....	.....	.38	3130	.....	40
41	Pontiac-Custom 6 41-24	122	58	61 1/2	211 1/2	.....	6.50/16	4.30	6-3 7/16 x4	L	IL	CI	239.2	30.4	90-3200	175-1400	6.50	7.50	155	1000	.....	.....	.38	3130	.....	41
42	Pontiac-DeLuxe 8 41-27	119	58	61 1/2	201 1/2	.....	6.00/16	4.10	8-3 1/4 x3 3/4	L	IL	CI	248.9	33.8	103-3500	190-2200	6.50	7.50	155	1000	.....	.....	.41	3059	.....	42
43	Pontiac-Streamliner 8 41-28	122	58	61 1/2	207 1/2	.....	6.50/16	4.30	8-3 1/4 x3 3/4	L	IL	CI	248.9	33.8	103-3500	190-2200	6.50	7.50	155	1000	.....	.....	.41	3130	.....	43
44	Pontiac-Custom 8 41-29	122	58	61 1/2	211 1/2	.....	6.50/16	4.30	8-3 1/4 x3 3/4	L	IL	CI	248.9	33.8	103-3500	190-2200	6.50	7.50	155	1000	.....	.....	.41	3130	.....	44
45	Studebaker-Champion 3G	110	56 1/4	57	190 1/2	2435	5.50/16	4.56	6-3x4	L	IL	CI	169.6	21.6	80-4000	134-2000	6.50	.....	105	150	17.30	36.70	.47	3516	39.2	45
46	Studebaker-Commander 6 11A	119	58 1/4	60 5/16	205 3/4	3150	6.25/16	4.55	6-3 5/8 x4 3/8	L	IL	CI	226.2	26.3	94-3600	176-1600	6.50	7.00	105	150	16.14	38.83	.42	3358	40.2	46
47	Studebaker-President 8 7C	124 1/2	58 1/16	60 5/16	211 1/4	3500	7.00/16	4.55	8-3 1/8 x4 1/4	L	IL	CI	250.4	30.0	117-4000	200-2400	6.50	.....	105	150	15.97	34.19	.47	3212	39.0	47
48	Willys-Americar 441	104	55 1/4	58 1/4	181	2370	5.50/16	4.44	4-3 1/8 x4 7/8	L	IL	CI	134.2	15.6	63-3900	108-1800	6.48	7.10	114	185	21.30	45.50	.47	3422	30.8	48

ABBREVIATIONS:

*—Performance data based on shipping weights plus 500 lbs. for gasoline, water, oil and normal load.
°—Aluminum optional
†—Computed on basis of tire revolutions per mile multiplied by rear axle ratio of cheapest 5-passenger, 4-door sedan.
††—Computed on basis of displacement, rear axle ratio, effective tire diameter, and shipping weight plus 500 pounds of lowest priced 5-passenger, four-door sedan.
(c)—De Luxe 2950; Traveler 2900
(d)—De Luxe 6.00/16; Traveler 5.50/16
(e)—Model 11—3050; Model 12—3100
(f)—Model 11—6.00/16; Model 12—6.25/16
(g)—Models 1903-6—3.92; Models 1904-7—4.09; Models 1905-8—4.36
(h)—Models 1903-4-6-7—59 1/16; Models 1905-8—62 9/16
(i)—Model 1903—206 5/16; 1904—217 1/32; 1905—227 3/16
(k)—Model 1906—212 1/8; 1907—217 1/32; 1908—227 3/16
(m)—Models 61, 63—215 in.; 62—216 in.; 60S—217 3/16 in.
(n)—Models 67—228 in.; 75—226 1/8 in.
(p)—19.6 lbs on De Luxe, 19.4 lbs. on Traveler
(r)—37.5 lbs. on De Luxe, 36.9 lbs on Traveler
(t)—16 74 lbs. on Model 11, 16.98 on Model 12
(u)—34.8 lbs. on Model 11, 35.3 on Model 12
AI—Aluminum
CI—Cast Iron
IL—In Line
No—No or None
I—In Head
L—L-Head
V—Vee Type

Pistons, Rings, Connecting Rods

Line Numbers	PASSENGER CAR MAKE AND MODEL	Number of Cylinders, Bore and Stroke (In.)	PISTON									PISTON RINGS								WRIST PIN				CONNECTING RODS			Line Numbers
			Make	Material	Features	Weight (Oz.) Without Rings, Pin or Bushing	Length (In.)	Clearance—Average (In.)		Ring Groove Depth (In.)		Oil				Compression				Length (In.)	Diameter (In.)	Locked In	Average Clearance (In.)	Length (In.)—Center to Center	Material (S. A. E. No.)	Weight (Oz.)	
								Top Land	Bottom or Skirt	Oil	Compression	Number Used	Width (In.)	Average Gap (In.)	Maximum Wall Thickness (In.)	Number Used	Width (In.)	Average Gap (In.)	Maximum Wall Thickness (In.)								
1	Bantam 65	4-2.26x3.125	BA	Als	Ss,O,Tp,Au	5.12	2.083	.0147	.0010	.118	.118	1	.1237	.014	.110	2	.0930	.015	.105	1.937	.6095	R	.00015	5 3/4	1045	11.00	1
2	Buick-Special 41-40	8-3 1/8x4 1/8	A-B	Al	C,Md,Trs,An	13.78	4 5/16	.0265	(a)	.166	.166	2	3/16	.015	.140	2	3/32	.015	(c)	2 1/16	.8126	R	.00035	7 5/16	1045	28.46	2
3	Buick-Super 41-50	8-3 1/8x4 1/8	A-B	Al	C,Md,Trs,An	13.78	4 5/16	.0265	(a)	.166	.166	2	3/16	.015	.140	2	3/32	.015	(c)	2 1/16	.8126	R	.00035	7 5/16	1045	28.46	3
4	Buick-Century 41-60	8-3 1/8x4 1/8	A-B	Al	C,Md,Trs,An	17.94	4 5/16	.0315	(b)	.182	.182	2	3/16	.015	.140	2	3/32	.015	(d)	3 1/16	.8746	R	.00035	8 1/4	1045	35.58	4
5	Buick-Roadmaster 41-70	8-3 1/8x4 1/8	A-B	Al	C,Md,Trs,An	17.94	4 5/16	.0315	(b)	.182	.182	2	3/16	.015	.140	2	3/32	.015	(d)	3 1/16	.8746	R	.00035	8 1/4	1045	35.58	5
6	Buick-Limited 41-90	8-3 1/8x4 1/8	A-B	Al	C,Md,Trs,An	17.94	4 5/16	.0315	(b)	.182	.182	2	3/16	.015	.140	2	3/32	.015	(d)	3 1/16	.8746	R	.00035	8 1/4	1045	35.58	6
7	Cadillac-V8 61, 62, 63, 60S	8-3 1/16x4 1/2	A-B	Al	Ts,An	18.30	4 1/8	.0196	.0019	.160	(e)	2	3/32	.012	.150	2	(f)	.012	(z)	3 1/16	7/8	F	.00007	8 3/4	1035	37.47	7
8	Cadillac-V8 67, 75	8-3 1/16x4 1/2	A-B	Al	Ts,An	18.30	4 1/8	.0196	.0019	.160	(e)	2	3/32	.012	.150	2	(f)	.012	(z)	3 1/16	7/8	F	.00007	8 3/4	1035	37.47	8
9	Chevrolet-Special DeL. & Master DeL.	6-3 1/16x3 3/4	Own	CI	O,Tp,Sp,Fh	28.00*	3 3/4	.0165	.0020	.178	.158	1	.1862	.010	.155	2	.1237	.010	.155	3.150	.8647	R	SF	6 1/32	DFS	28.30	9
10	Chrysler-Royal & Windsor C-28	6-3 3/16x4 1/2	BA	Al	Us,C	17.50	3 7/8	.0015	(g)	.177	.157	2	3/32	.011	.145	2	1/16	.011	(h)	2 7/8	33/64	F	.0001	7 7/8	MFS	.....	10
11	Chrysler-New Yorker C30N, 30K	8-3 1/16x4 7/8	BA	.....	Us,C	16.30	3 7/8	.0110	(g)	.177	.157	2	3/32	.011	.145	2	1/16	.011	(h)	2 3/4	33/64	F	.0001	9	MFS	37.3	11
12	Chrysler-Crown Imperial C33	8-3 1/4x4 7/8	BA	Al	Us,C	16.30	3 7/8	.0110	(g)	.177	.157	2	3/32	.011	.145	2	1/8	.011	(h)	2 3/4	33/64	F	.0001	9	MFS	37.3	12
13	Crosley CB-41	2-3x2 1/2	.....	CI	.....	17.50	2.802	.0135	.0043	.158	.138	1	5/32	.015	.135	2	1/16	.015	.130	2.636	.7497	F	.0002	4 3/4	1045	18.0	13
14	De Soto-DeLuxe & Custom S-8	6-3 3/16x4 1/4	BA	Al	Us,C	17.50	3 7/8	.0115	(g)	.177	.157	2	3/32	.011	.145	2	1/16	.011	(h)	2 7/8	33/64	F	.0001	8	MFS	.....	14
15	Dodge-DeLuxe & Custom D-19	6-3 1/4x4 3/8	A-A	Al	Ss,C,An	31 1/2	.....	.0140	.0005	.174	(aa)	2	5/32	.011	.145	2	(f)	.011	(bb)	2 3/4	44/64	F	—.0002	7 1/16	MFS	.....	15
16	Ford-DeLuxe & Super DeLuxe	8-3.062x3.75	Own	CS	.....	11.82	.....	.003	.....	.....	.....	1	.1537	.0145	.110	2	.0917	.0145	(i)	2.850	.7502	F	.0005	7.002	DFS	16.79	16
17	Hudson-DeLuxe & Traveler 6 10	6-3x4 1/2	AC	Al	C,Ts	10.50	3 5/16	.016	.0007	.148	.148	2	(k)	.010	.128	2	.0930	.010	.123	2.437	3/4	F	SeF	8 5/16	DFS	31.36	17
18	Hudson-Super & Commodore 6 11-12	6-3x5	AC	Al	C,Ts	10.50	3 5/16	.016	.0007	.148	.148	2	(k)	.010	.128	2	.0930	.010	.123	2.437	3/4	F	SeF	8 5/16	DFS	31.36	18
19	Hudson-Commodore 8 14	8-3x4 1/2	AC	Al	C,Ts	10.50	3 5/16	.016	.0007	.148	.148	2	(k)	.010	.128	2	.0930	.010	.123	2.437	3/4	F	SeF	8 5/16	DFS	31.36	19
20	Hudson-Commodore Custom 8 17	8-3x4 1/2	AC	Al	C,Ts	10.50	3 5/16	.016	.0007	.148	.148	2	(k)	.010	.128	2	.0930	.010	.123	2.437	3/4	F	SeF	8 5/16	DFS	31.36	20
21	Lincoln-Zephyr & Continental	12-2.875x3.75	Own	CS	.....	12.70	.....	.002	.....	.....	.....	1	.1847	.010	.107	2	.0932	.010	(m)	2.607	.7502	F	.0005	7.400	DFS	22.51	21
22	Lincoln-Custom	12-2.875x3.75	Own	CS	.....	12.70	.....	.002	.....	.....	.....	1	.1847	.010	.107	2	.0932	.010	(m)	2.607	.7502	F	.0005	7.400	DFS	22.51	22
23	Mercury	8-3.187x3.75	Own	CS	.....	12.70	.....	.003	.....	.....	.....	1	.1537	.014	.112	2	.0917	.014	(n)	2.975	.7502	F	.0005	7.002	DFS	17.22	23
24	Nash-Ambassador 600 4140	4-3 1/4x3 3/4	.....	Al	.....	.....	3 5/8	.0175	.....	.182	.162	1	.186	.015	.....	2	.093	.015	.....	2.609	.8120	F	.0003	6 3/4	Steel	24.00	24
25	Nash-Ambassador 6 4160	6-3 3/8x4 3/8	BA	Al	Ss, O, Tp, Au	.....	3 7/8	.....	.0015	.175	.155	2	.155	.014	.145	2	.124	.015	.145	2.804	.8745	F	SeF	8 3/4	Steel	36.25	25
26	Nash-Ambassador 8 4180	8-3 1/4x4 1/4	BA	Al	Ss, O, Tp, Au	16.00	3 11/16	.....	.0015	.175	.155	2	(x)	.015	.130	2	.124	.020	.140	2.574	.8747	F	SeF	8 3/4	Steel	34.00	26
27	Oldsmobile-Special 6	6-3 1/2x4 1/8	AC	Al	Ts, An	17.37	4 3/32	.0255	.0007	.171	.187	2	3/16	.012	.155	2	3/32	.013	.172	3 3/32	33/64	P	.0004	7 1/16	1335	28.60	27
28	Oldsmobile-Dynamic 6	6-3 1/2x4 1/8	AC	Al	Ts, An	17.37	4 3/32	.0255	.0007	.171	.187	2	3/16	.012	.155	2	3/32	.013	.172	3 3/32	33/64	P	.0004	7 1/16	1335	28.60	28
29	Oldsmobile-Custom 6	6-3 1/2x4 1/8	AC	Al	Ts, An	17.37	4 3/32	.0255	.0007	.171	.187	2	3/16	.012	.155	2	3/32	.013	.172	3 3/32	33/64	P	.0004	7 1/16	1335	28.60	29
30	Oldsmobile-Special 8	8-3 1/4x3 7/8	AC	Al	Ts, An	16.00	3 13/16	.0255	.0015	.171	.156	2	3/16	.012	.145	2	3/32	.012	.150	2 1/16	33/64	P	.0004	7 1/16	1335	29.50	30
31	Oldsmobile-Dynamic 8	8-3 1/4x3 7/8	AC	Al	Ts, An	16.00	3 13/16	.0255	.0015	.171	.156	2	3/16	.012	.145	2	3/32	.012	.150	2 1/16	33/64	P	.0004	7 1/16	1335	29.50	31
32	Oldsmobile-Custom 8	8-3 1/4x3 7/8	AC	Al	Ts, An	16.00	3 13/16	.0255	.0015	.171	.156	2	3/16	.012	.145	2	3/32	.012	.150	2 1/16	33/64	P	.0004	7 1/16	1335	29.50	32
33	Packard-One Ten 1900	6-3 1/2x4 1/4	Al	Als	An, C, Tp	20.25	3 7/8	.....	.0007	.182	(o)	1	.1862	.011	.126	2	(p)	.011	.170	3 1/64	7/8	F	FP	7 1/16	DFS	31.60	33
34	Packard-One Twenty 1901	8-3 1/4x4 1/4	Al	Als	An, C, Tp	17.25	3 7/8	.....	.0007	.176	.178	1	.1862	.011	.125	2	(r)	.011	.157	2 1/64	7/8	F	FP	7 1/16	DFS	31.60	34
35	Packard-Super Eight 1903-4-5	8-3 1/2x4 5/8	Al	Als	An, C, Tp	20.25	3 7/8	.....	.0007	.182	(o)	1	.1862	.011	.126	2	(p)	.011	.170	3 1/64	7/8	F	FP	9 1/4	DFS	42.00	35
36	Packard-Custom Super Eight 1906-7-8	8-3 1/2x4 5/8	Al	Als	An, C, Tp	20.25	3 7/8	.....	.0007	.182	(o)	1	.1862	.011	.126	2	(p)	.011	.170	3 1/64	7/8	F	FP	9 1/4	DFS	42.00	36
37	Plymouth P-11	6-3 1/16x4 3/8	BA	Al	Us, C	14.40	3 11/16	.014	(s)	.169	(t)	2	3/32	.011	.145	2	(f)	.011	(v)	2 3/8	33/64	F	.0002	7 1/16	MFS	.....	37
38	Plymouth-Special DeLuxe P-12	6-3 1/16x4 3/8	BA	Al	Us, C	14.40	3 11/16	.014	(s)	.169	(t)	2	3/32	.011	.145	2	(f)	.011	(v)	2 3/8	33/64	F	.0002	7 1/16	MFS	.....	38
39	Pontiac-DeLuxe 6 41-25	6-3 7/8x4	Own	CN	Tp	27.00	3 31/32	.0245	.0020	.193	.187	1	3/16	.012	.155	2	3/32	.012	.175	3 1/16	33/64	P	.0004	7 1/16	DFS	36.96	39
40	Pontiac-Streamliner 6 41-26	6-3 7/8x4	Own	CN	Tp	27.00	3 31/32	.0245	.0020	.193	.187	1	3/16	.012	.155	2	3/32	.012	.175	3 1/16	33/64	P	.0004	7 1/16	DFS	36.96	40
41	Pontiac-Custom 6 41-24	6-3 7/8x4	Own	CN	Tp	27.00	3 31/32	.0235	.0020	.193	.187	1	3/16	.012	.155	2	3/32	.012	.175	3 1/16	33/64	P	.0004	7 1/16	DFS	36.96	41
42	Pontiac-DeLuxe 8 41-27	8-3 1/4x3 3/4	Own	CN	Tp	24.62	3 31/32	.0235	.0020	.189	.167	1	3/16	.012	.150	2	3/32	.012	.150	2 7/8	33/64	P	.0004	7 1/16	DFS	31.68	42
43	Pontiac-Streamliner 8 41-28	8-3 1/4x3 3/4	Own	CN	Tp	24.62	3 31/32	.0235	.0020	.189	.167	1	3/16	.012	.150	2	3/32	.012	.150	2 7/8	33/64	P	.0004	7 1/16	DFS	31.68	43
44	Pontiac-Custom 8 41-29	8-3 1/4x3 3/4	Own	CN	Tp	24.62	3 31/32	.0235	.0020	.189	.167	1	3/16	.012	.150	2	3/32	.012	.150	2 7/8	33/64	P	.0004	7 1/16	DFS	31.68	44
45	Studebaker-Champion 3G	6-3x4	AC	Lyn	Ss, O, Tp	8.96	2 29/32	.0165	.0015	.168	.163	1	1/16	.012	.135	2	(w)	.012	(y)	2 5/8	33/64	R	.0002	6 3/8	DFS	20.96	45
46	Studebaker-Commander 6 11A	6-3 3/8x4 3/4	AC	Lyn	Ss,O,Tp,Ts,C	14.40	3 3/4	.0150	.0015	.185	.170	1	.1862	.012	.150	2	.0930	.012	.155	2 7/8	7/8	R	.0002	8 1/8	DFS	33.20	46
47	Studebaker-President 8 7C	8-3 1/16x4 1/4	AC	Lyn	Ts, C, Tp	13.60	3 3/4	.0140	.0015	.169	.149	1	3/16	.017	.125	2	1/8	.018	.135	2 5/8	7/8	R	.0002	8	DFS	32.00	47
48	Willys-Americar 441	4-3 1/16x4 3/8	A-A	Al	O, Tp, Ts, C	12.50	3 3/4	.0215	.0030	.170	.160	1	1/16	.010	.140	2	3/32	.010	.135	2 23/32	11/16	R	.0005	9 3/16	1035	34.00	48

ABBREVIATIONS:

*—With Rings, Pin and Bushing
(a)—.0021 Top of Skirt
(aa)—Upper .171, Intermediate .154
(b)—.0023 Top of Skirt
(bb)—Upper. 162, Intermediate .145
(c)—Upper. 155, Lower .140
(d)—Upper .172, Lower .150
(e)—Upper .181, Lower .151
(f)—Upper 3/32, Lower 1/8
(g)—At Maximum Diameter .0000-.0010
(h)—Upper .150, Lower .145
(i)—No. 1—.135, No. 2—.110
(k)—.187 Above Pin, .155 Below Pin
(m)—No. 1—.127, No. 2—.107
(n)—No. 1—.137, No. 2—.116
(o)—No. 1—.1882, No. 2—.1837
(p)—No. 1—.0932, No. 2—.1237
(r)—No. 1—.0930, No. 2—.1237
(s)—At Maximum Diameter .0001-.0011
(t)—Upper .179, Lower .149
(v)—Upper .156, Lower .140
(w)—One 3/32, One 1/8
(y)—Top .150, Bottom .135
(x)—Third .124, Fourth .186
(z)—Upper .175, Lower .150
A-A—Aluminum Company of America and Aluminum Industries, Inc.
A-B—Aluminum Company of America and Bohn Aluminum and Brass Corp.
AC—Aluminum Company of America
Al—Aluminum Industries, Inc.
Al—Aluminum Alloy
Als—Aluminum Alloy with Strut
An—Anodized Finish
Au—Autothermic
BA—Bohn Aluminum and Brass Corp.
C—Cam Ground
CI—Cast Iron
CN—Chrome Nickel Alloy
CS—Cast Steel
DFS—Drop Forged Steel
F—Floating
Fh—Flat Head
FP—Finger Push at 160°
Lyn—Lynite
Md—Modified Dome
MFS—High Manganese Forging Steel
O—Oval
P—Piston
R—Locked in Connecting Rod
SeF—Selective Fit
SF—Slip Fit
Sp—Slipper Skirt
Ss—Split Skirt
Tp—Tin Plated
Trs—Transverse Slot
Ts—"T" Slot
Us—"U" Slot

Connecting Rod and Crankshaft Bearings

Line Numbers	PASSENGER CAR MAKE AND MODEL	CONNECTING ROD BEARINGS: Crankpin Journal: Diameter and Length (In.)	CONNECTING ROD BEARINGS: Lower Bearing: Material	Average Clearance (In.)	Average End Play (In.)	Type of Shim	Type of Bearing	Rods and Pins Removed from	CRANKSHAFT: Vibration Damper	Counterweights	End Thrust taken by	Amount of End Play (In.)	MAIN BEARINGS: Type	Material	Clearance (In.)	Type of Shim	Diameter and Length: No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	No. 9	Line Numbers
1	Bantam 65	1.25x1	Bab	.0015	.0065	No	Spun	A	No	2	R	.005	PI	BSb	.0020	No	1.997x1.188	2.497x1.005	2.497x1.161							1
2	Buick-Special 41-40	2x1.212	Bab	.0013	.0075	So	Spun	A	Yes	8	C	.006	SI	DSb	.0014	So	$2\frac{13}{16}$x$1\frac{17}{64}$	$2\frac{3}{8}$x$1\frac{15}{16}$	$2\frac{7}{16}$x$1\frac{15}{16}$	$2\frac{1}{2}$x$1\frac{15}{16}$	$2\frac{9}{16}$x$1\frac{15}{16}$					2
3	Buick-Super 41-50	2x1.212	Bab	.0013	.0075	So	Spun	A	Yes	8	C	.006	SI	DSb	.0014	So	$2\frac{9}{16}$x$1\frac{17}{64}$	$2\frac{3}{8}$x$1\frac{15}{16}$	$2\frac{7}{16}$x$1\frac{15}{16}$	$2\frac{1}{2}$x$1\frac{15}{16}$	$2\frac{9}{16}$x$1\frac{15}{16}$					3
4	Buick-Century 41-60	$2\frac{1}{4}$x1.306	Bab	.0013	.0075	So	Spun	A	Yes	8	C	.006	SI	DSb	.0014	So	$2\frac{9}{16}$x$1\frac{9}{16}$	$2\frac{3}{8}$x$2\frac{1}{16}$	$2\frac{11}{16}$x$2\frac{1}{16}$	$2\frac{3}{4}$x$2\frac{1}{16}$	$2\frac{13}{16}$x$2\frac{1}{16}$					4
5	Buick-Roadmaster 41-70	$2\frac{1}{4}$x1.306	Bab	.0013	.0075	So	Spun	A	Yes	8	C	.006	SI	DSb	.0014	So	$2\frac{9}{16}$x$1\frac{9}{16}$	$2\frac{3}{8}$x$2\frac{1}{16}$	$2\frac{11}{16}$x$2\frac{1}{16}$	$2\frac{3}{4}$x$2\frac{1}{16}$	$2\frac{13}{16}$x$2\frac{1}{16}$					5
6	Buick-Limited 41-90	$2\frac{1}{4}$x1.306	Bab	.0013	.0075	So	Spun	A	Yes	8	C	.006	SI	DSb	.0014	So	$2\frac{9}{16}$x$1\frac{9}{16}$	$2\frac{3}{8}$x$2\frac{1}{16}$	$2\frac{11}{16}$x$2\frac{1}{16}$	$2\frac{3}{4}$x$2\frac{1}{16}$	$2\frac{13}{16}$x$2\frac{1}{16}$					6
7	Cadillac-V8 61, 62, 63, 60S	2.460x2$\frac{1}{32}$	BSb	.0015	.0045	No	Sep	A	Yes	6	C	.003	SI	BSb	.0015	No	$2\frac{1}{2}$x$1\frac{1}{16}$	$2\frac{1}{2}$x$1\frac{1}{32}$	$2\frac{1}{2}$x$1\frac{1}{32}$							7
8	Cadillac-V8 67, 75	2.460x2$\frac{1}{32}$	BSb	.0015	.0045	No	Sep	A	Yes	6	C	.003	SI	BSb	.0015	No	$2\frac{1}{2}$x$1\frac{1}{16}$	$2\frac{1}{2}$x$1\frac{1}{32}$	$2\frac{1}{2}$x$1\frac{1}{32}$							8
9	Chevrolet-Spec. DeL. & Mas. DeL.	2.311x1.500	Bab	.0017	.0080	So	Spun	A	Yes	7	RI	.005	SI	BSb	.0030	So	$2\frac{13}{16}$x$1\frac{7}{16}$	$2\frac{13}{16}$x$1\frac{7}{16}$	$2\frac{13}{16}$x$1\frac{7}{16}$	$2\frac{13}{16}$x$1\frac{5}{8}$						9
10	Chrys.-Roy. & Windsor C-28	$2\frac{1}{4}$x$1\frac{3}{32}$	BSb	.0015	.0085	No	Sep	A	Yes	9	R	.005	SI	BSb		No	$2\frac{1}{2}$x$1\frac{1}{16}$	$2\frac{1}{2}$x$1\frac{1}{16}$	$2\frac{1}{2}$x$1\frac{1}{16}$	$2\frac{1}{2}$x$1\frac{7}{8}$						10
11	Chrysler-New Yorker. C30N, 30K	$2\frac{5}{16}$x$1\frac{1}{8}$	BSb	.0020	.0085	No	Sep	A	Yes	8	R	.005	SI	BSb	.0015	No	$2\frac{13}{16}$x$1\frac{23}{32}$	$2\frac{13}{16}$x$1\frac{1}{8}$	$2\frac{13}{16}$x$1\frac{1}{16}$	$2\frac{13}{16}$x$1\frac{1}{8}$	$2\frac{13}{16}$x$2\frac{3}{32}$					11
12	Chrysler-Crown Imperial C33	$2\frac{5}{16}$x$1\frac{1}{8}$	BSb	.0020	.0085	No	Sep	A	Yes	8	R	.005	SI	BSb	.0015	No	$2\frac{13}{16}$x$1\frac{23}{32}$	$2\frac{13}{16}$x$1\frac{1}{8}$	$2\frac{13}{16}$x$1\frac{1}{16}$	$2\frac{13}{16}$x$1\frac{1}{8}$	$2\frac{13}{16}$x$2\frac{3}{32}$					12
13	Crosley CB-41	$\frac{3}{4}$x1.000	Bab	.0015	.0072	No	Sep	A	No	4	R	.004	SI	BSb	.0020	No	$1\frac{13}{16}$x$1\frac{1}{4}$	$2\frac{1}{4}$x$1\frac{1}{2}$								13
14	De Soto-DeLuxe & Custom. S-8	$2\frac{1}{4}$x$1\frac{7}{32}$	BSb	.0015	.0085	No	Sep	A	Yes	7	R	.005	SI	BSb	.0015	No	$2\frac{1}{2}$x$1\frac{1}{16}$	$2\frac{1}{2}$x$1\frac{1}{16}$	$2\frac{1}{2}$x$1\frac{1}{16}$	$2\frac{1}{2}$x$1\frac{7}{8}$						14
15	Dodge-DeLuxe & Custom. D-19	$2\frac{1}{4}$x1	BSb	.0015	.0085	No	Sep	A	Yes	7	R	.005	SI	BSb		No	$2\frac{1}{2}$x$1\frac{1}{16}$	$2\frac{1}{2}$x$1\frac{1}{32}$	$2\frac{1}{2}$x$1\frac{1}{32}$	$2\frac{1}{2}$x$1\frac{7}{8}$						15
16	Ford-DeLuxe & Super DeLuxe	1.999x1.750	CSS			No	Sep	A	No	6	R	.004	SI			No	2.499x1.506	2.499x1.506	2.499x2.251							16
17	Hudson-DeLuxe & Traveler 6 10	1.937x1.375	SAE13	.0004	.0100	No	Spun	A	Yes	8	C	.009	....	BB	.0010	No	2.343x1.625	2.375x1.750	2.406x2.375							17
18	Hudson-Super & Comm. 6 11-12	1.937x1.375	SAE13	.0004	.0100	No	Spun	A	Yes	8	C	.009	....	BB	.0010	No	2.343x1.625	2.375x1.750	2.406x2.375							18
19	Hudson-Commodore 8 14	1.937x1.375	SAE13	.0004	.0100	No	Spun	A	Yes	8	C	.009	....	BB	.0010	No	2.281x1.625	2.312x1.375	2.343x1.875	2.375x1.375	2.406x2.000					19
20	Hudson-Comm. Custom 8 17	1.937x1.375	SAE13	.0004	.0100	No	Spun	A	Yes	8	C	.009	....	BB	.0010	No	2.281x1.625	2.312x1.375	2.343x1.875	2.375x1.375	2.406x2.000					20
21	Lincoln-Zephyr & Continental	2.126x1.750				No	Sep	A			R	.004	SI	SSb		No	2.401x1.625	2.401x1.248	2.401x1.248	2.401x2.248						21
22	Lincoln-Custom	2.126x1.750				No	Sep	A			R	.004	SI	SSb		No	2.401x1.625	2.401x1.248	2.401x1.248	2.401x2.248						22
23	Mercury	2.139x1.750	CSS			No	Sep	A	No	6	R	.004	SI	SSb		No	2.499x1.506	2.499x1.506	2.499x2.251							23
24	Nash-Ambassador 600 4140	1.989x1.250	BSb	.0017	.0060	No		A	Yes	4	F	.004	SI	BSb	.0020	No	$2\frac{11}{16}$x$1\frac{5}{8}$	$2\frac{11}{16}$x$1\frac{5}{8}$	$2\frac{11}{16}$x$1\frac{3}{4}$	$2\frac{11}{16}$x$1\frac{3}{4}$						24
25	Nash-Ambassador 6 4160	2.002x1.426	BSb	.0018	.0100	No	Sep	A	Yes	4	C	.004	SI	BSb	.0020	No	$2\frac{13}{16}$x$1\frac{1}{4}$	$2\frac{13}{16}$x$1\frac{1}{8}$	$2\frac{13}{16}$x$1\frac{7}{8}$	$2\frac{13}{16}$x$1\frac{1}{8}$	$2\frac{13}{16}$x$1\frac{1}{8}$	$2\frac{13}{16}$x$1\frac{1}{8}$	$2\frac{13}{16}$x$1\frac{15}{16}$			25
26	Nash-Ambassador 8 4180	2.002x1.239	BSb	.0020	.0100	No	Sep	A	Yes	No	C	.004	SI	BSb	.0020	No	$2\frac{13}{16}$x$1\frac{1}{2}$	$2\frac{13}{16}$x$1\frac{1}{8}$	$2\frac{13}{16}$x$1\frac{1}{16}$	$2\frac{13}{16}$x$1\frac{1}{8}$	$2\frac{13}{16}$x$1\frac{15}{16}$	$2\frac{13}{16}$x$1\frac{1}{8}$	$2\frac{13}{16}$x$1\frac{15}{16}$	$2\frac{13}{16}$x$1\frac{1}{16}$	$2\frac{13}{16}$x$2\frac{3}{32}$	26
27	Oldsmobile-Special 6	$2\frac{1}{16}$x$1\frac{1}{4}$	BSb	.0015	.0080	No	Sep	A	Yes	4	F	.006	SI	BSb	.0017	No	$2\frac{11}{16}$x$1\frac{17}{32}$	$2\frac{11}{16}$x$1\frac{13}{16}$	$2\frac{11}{16}$x$1\frac{13}{16}$	$2\frac{11}{16}$x$1\frac{15}{16}$						27
28	Oldsmobile-Dynamic 6	$2\frac{1}{16}$x$1\frac{1}{4}$	BSb	.0015	.0080	No	Sep	A	Yes	4	F	.006	SI	BSb	.0017	No	$2\frac{11}{16}$x$1\frac{17}{32}$	$2\frac{11}{16}$x$1\frac{13}{16}$	$2\frac{11}{16}$x$1\frac{13}{16}$	$2\frac{11}{16}$x$1\frac{15}{16}$						28
29	Oldsmobile-Custom 6	$2\frac{1}{16}$x$1\frac{1}{4}$	BSb	.0015	.0080	No	Sep	A	Yes	4	F	.006	SI	BSb	.0017	No	$2\frac{11}{16}$x$1\frac{17}{32}$	$2\frac{11}{16}$x$1\frac{13}{16}$	$2\frac{11}{16}$x$1\frac{13}{16}$	$2\frac{11}{16}$x$1\frac{15}{16}$						29
30	Oldsmobile-Special 8	$2\frac{1}{16}$x$1\frac{3}{8}$	BSb	.0015	.0080	No	Sep	A	Yes	8	F	.006	SI	BSb	.0020	No	$2\frac{11}{16}$x$1\frac{23}{32}$	$2\frac{11}{16}$x$1\frac{7}{16}$	$2\frac{11}{16}$x$1\frac{7}{16}$	$2\frac{11}{16}$x$1\frac{7}{16}$	$2\frac{11}{16}$x$1\frac{11}{16}$					30
31	Oldsmobile-Dynamic 8	$2\frac{1}{16}$x$1\frac{3}{8}$	BSb	.0015	.0080	No	Sep	A	Yes	8	F	.006	SI	BSb	.0020	No	$2\frac{11}{16}$x$1\frac{23}{32}$	$2\frac{11}{16}$x$1\frac{7}{16}$	$2\frac{11}{16}$x$1\frac{7}{16}$	$2\frac{11}{16}$x$1\frac{7}{16}$	$2\frac{11}{16}$x$1\frac{11}{16}$					31
32	Oldsmobile-Custom 8	$2\frac{1}{16}$x$1\frac{3}{8}$	BSb	.0015	.0080	No	Sep	A	Yes	8	F	.006	SI	BSb	.0020	No	$2\frac{11}{16}$x$1\frac{23}{32}$	$2\frac{11}{16}$x$1\frac{7}{16}$	$2\frac{11}{16}$x$1\frac{7}{16}$	$2\frac{11}{16}$x$1\frac{7}{16}$	$2\frac{11}{16}$x$1\frac{11}{16}$					32
33	Packard-One Ten 1900	$2\frac{1}{16}$x$1\frac{1}{4}$		.0010	.0070	No	Sep	A	Yes	6	F	.005	....	BSb	.0010	No	$2\frac{13}{16}$x$1\frac{1}{16}$	$2\frac{13}{16}$x$1\frac{1}{2}$	$2\frac{13}{16}$x$1\frac{1}{2}$	$2\frac{13}{16}$x$2\frac{1}{8}$						33
34	Packard-One Twenty 1901	$2\frac{1}{16}$x$1\frac{1}{4}$		.0010	.0070	No	Sep	A	Yes	8	C	.005	....	BSb	.0010	No	$2\frac{13}{16}$x$1\frac{1}{2}$	$2\frac{13}{16}$x$1\frac{1}{2}$	$2\frac{13}{16}$x$1\frac{1}{2}$	$2\frac{13}{16}$x$2\frac{1}{8}$						34
35	Packard-Super Eight 1903-4-5	$2\frac{1}{16}$x$1\frac{3}{8}$		.0010	.0070	No	Sep	A	Yes	8	C	.005	....	BSb	.0010	No	$2\frac{13}{16}$x$1\frac{1}{2}$	$2\frac{13}{16}$x$1\frac{7}{16}$	$2\frac{13}{16}$x$1\frac{7}{16}$	$2\frac{13}{16}$x$1\frac{7}{16}$	$2\frac{13}{16}$x$1\frac{11}{16}$	$2\frac{13}{16}$x$1\frac{7}{16}$	$2\frac{13}{16}$x$1\frac{11}{16}$	$2\frac{13}{16}$x$1\frac{7}{16}$	$2\frac{13}{16}$x$2\frac{3}{32}$	35
36	Packard-Cus. Sup. Eight 1906-7-8	$2\frac{1}{16}$x$1\frac{3}{8}$		.0010	.0070	No	Sep	A	Yes	8	C	.005	....	BSb	.0010	No	$2\frac{13}{16}$x$1\frac{1}{2}$	$2\frac{13}{16}$x$1\frac{7}{16}$	$2\frac{13}{16}$x$1\frac{7}{16}$	$2\frac{13}{16}$x$1\frac{7}{16}$	$2\frac{13}{16}$x$1\frac{11}{16}$	$2\frac{13}{16}$x$1\frac{7}{16}$	$2\frac{13}{16}$x$1\frac{11}{16}$	$2\frac{13}{16}$x$1\frac{7}{16}$	$2\frac{13}{16}$x$2\frac{3}{32}$	36
37	Plymouth P-11	$1\frac{13}{16}$x1	BSb	.0015	.0085	No	Sep	A	No	7	R	.005	SI	BSb	.0015	No	$2\frac{1}{4}$x$1\frac{13}{16}$	$2\frac{1}{4}$x$1\frac{1}{2}$	$2\frac{1}{4}$x$1\frac{1}{2}$	$2\frac{1}{4}$x$1\frac{7}{8}$						37
38	Plymouth-Special DeLuxe P-12	$1\frac{13}{16}$x1	BSb	.0015	.0085	No	Sep	A	No	7	R	.005	SI	BSb	.0015	No	$2\frac{1}{4}$x$1\frac{13}{16}$	$2\frac{1}{4}$x$1\frac{1}{2}$	$2\frac{1}{4}$x$1\frac{1}{2}$	$2\frac{1}{4}$x$1\frac{7}{8}$						38
39	Pontiac-DeLuxe 6 41-25	$2\frac{1}{16}$x$1\frac{3}{8}$	WSb	.0011	.0095	No	Sep	A	Yes	9	RC	.005	SI	WSb	.0013	No	$2\frac{13}{16}$x$1\frac{1}{4}$	$2\frac{13}{16}$x$1\frac{1}{16}$	$2\frac{13}{16}$x$1\frac{1}{16}$	$2\frac{13}{16}$x$1\frac{1}{16}$						39
40	Pontiac-Streamliner 6 41-26	$2\frac{1}{16}$x$1\frac{3}{8}$	WSb	.0011	.0095	No	Sep	A	Yes	9	RC	.005	SI	WSb	.0013	No	$2\frac{13}{16}$x$1\frac{1}{4}$	$2\frac{13}{16}$x$1\frac{1}{16}$	$2\frac{13}{16}$x$1\frac{1}{16}$	$2\frac{13}{16}$x$1\frac{1}{16}$	$2\frac{5}{8}$x$1\frac{1}{16}$					40
41	Pontiac-Custom 6 41-24	$2\frac{1}{16}$x$1\frac{3}{32}$	WSb	.0011	.0095	No	Sep	A	Yes	9	RC	.005	SI	WSb	.0013	No	$2\frac{13}{16}$x$1\frac{1}{4}$	$2\frac{13}{16}$x$1\frac{1}{16}$	$2\frac{13}{16}$x$1\frac{1}{16}$	$2\frac{13}{16}$x$1\frac{1}{16}$	$2\frac{5}{8}$x$1\frac{1}{16}$					41
42	Pontiac-DeLuxe 8 41-27	2x$1\frac{1}{16}$	WSb	.0011	.0095	No	Sep	A	Yes	8	C	.005	SI	WSb	.0013	No	$2\frac{9}{16}$x$1\frac{1}{4}$	$2\frac{13}{16}$x$1\frac{1}{16}$	$2\frac{13}{16}$x$1\frac{1}{16}$	$2\frac{13}{16}$x$1\frac{1}{16}$						42
43	Pontiac-Streamliner 8 41-28	2x$1\frac{1}{16}$	WSb	.0011	.0095	No	Sep	A	Yes	8	C	.005	SI	WSb	.0013	No	$2\frac{9}{16}$x$1\frac{1}{4}$	$2\frac{13}{16}$x$1\frac{1}{16}$	$2\frac{13}{16}$x$1\frac{1}{16}$	$2\frac{13}{16}$x$1\frac{1}{16}$	$2\frac{13}{16}$x$1\frac{7}{8}$					43
44	Pontiac-Custom 8 41-29	2x$1\frac{1}{16}$	WSb	.0011	.0095	No	Sep	A	Yes	8	C	.005	SI	WSb	.0013	No	$2\frac{9}{16}$x$1\frac{1}{4}$	$2\frac{13}{16}$x$1\frac{1}{16}$	$2\frac{13}{16}$x$1\frac{1}{16}$	$2\frac{13}{16}$x$1\frac{1}{16}$	$2\frac{13}{16}$x$1\frac{7}{8}$					44
45	Studebaker-Champion 3A	$1\frac{13}{16}$x$1\frac{1}{8}$	Bab	.0012	.0070	No	Spun	A	No	4	F	.004	SI	BSb	.0015	No	$2\frac{1}{16}$x$1\frac{5}{8}$	$2\frac{1}{16}$x$1\frac{5}{8}$	$2\frac{1}{16}$x$1\frac{5}{8}$	$2\frac{1}{16}$x$1\frac{3}{4}$						45
46	Studebaker-Commander 6 11G	$2\frac{1}{16}$x$1\frac{5}{8}$	Bab	.0012	.0070	No	Spun	A	Yes	5	F	.004	SI	BSb	.0015	No	$2\frac{1}{16}$x$1\frac{1}{8}$	$2\frac{1}{16}$x$1\frac{1}{4}$	$2\frac{1}{16}$x$1\frac{1}{4}$	$2\frac{1}{16}$x$1\frac{3}{4}$						46
47	Studebaker-President 8 7C	$1\frac{7}{8}$x$1\frac{1}{16}$	Clev	.0017	.0075	No	Sep	A	Yes	12	F	.004	SI	BSb	.0015	No	$2\frac{1}{32}$x1	$2\frac{1}{32}$x$\frac{29}{32}$	$2\frac{1}{32}$x$\frac{29}{32}$	$2\frac{1}{32}$x$1\frac{3}{32}$	$2\frac{1}{32}$x$\frac{29}{32}$	$2\frac{1}{32}$x$\frac{29}{32}$	$2\frac{1}{32}$x$\frac{29}{32}$	$2\frac{1}{32}$x$\frac{29}{32}$	$2\frac{1}{32}$x$1\frac{1}{32}$	47
48	Willys-Americar 441	$1\frac{1}{16}$x$1\frac{5}{16}$	Bab	.0015	.0070	No	Spun	A	No	4	F	.005	SI	BSb	.0010	No	2.334x1.920	2.334x$1\frac{13}{16}$	2.324x$1\frac{3}{4}$							48

ABBREVIATIONS:

A—Rods and Pistons Removed from Above
Bab—Babbitt
BB—Bronze Backed Babbitt
BSb—Babbitt—Steel Backed
C—Center Bearing
Clev—Clevite No. 1535
CSS—Cadmium-Silver-Copper Lined, Steel Backed
DSb—Durex—Steel Backed
F—Front
Int—Integral
No—No or None
PI—Pressed-In
R—Rear Bearing
RC—Rear Center
RI—Rear Intermediate
Sep—Separate
SI—Slip-In Type
So—Solid
SSb—Special Alloy, Steel Backed
WSb—Steel Backed—White Bearing Metal Alloy

Valves, Intake and Exhaust

Line Numbers	PASSENGER CAR MAKE AND MODEL	INTAKE VALVE														EXHAUST VALVE														Line Numbers
		Make	Overall Length (In.)	Head		Seat		Stem Diameter (In.)	Stem to Guide Clearance (In.) Average	Lift (In.)	Springs					Make	Overall Length	Head		Seats			Stem Diameter (In.)	Stem to Guide Clearance (In.) Average	Lift (In.)	Springs						
				Material	Overall Diameter (In.)	Angle (Deg.)	Inserts Used				Pressure (Lb.)		Length (In.)					Material	Overall Diameter	Angle (Deg.)	Inserts Used	Material				Pressure (Lb.)		Length (In.)			
											Valve Closed	Valve Open	Valve Closed	Valve Open	Out of Engine											Valve Closed	Valve Open	Valve Closed	Valve Open	Out of Engine	
1	Bantam 65	WR	3.250	3140	1.125	45	N	.279	.0022	.257	28	44	1.125	1	1.687	WR	3.250	Sil	1.031	45	N	N	.279	.0022	.257	28	44	1.125	1	1.687	1
2	Buick-Special 41-40	T-R	5.109	(a)	1.531	45	N	.372	.0025	.348	18†	48†	1.656†	1.312†	1.875	T-R	5.109	(b)	1.343	45	N	N	.371	.0030	.348	18†	48†	1.656†	1.312†	1.875	2
3	Buick-Super 41-50	T-R	5.109	(a)	1.531	45	N	.372	.0025	.348	18†	48†	1.656†	1.312†	1.875	T-R	5.109	(b)	1.343	45	N	N	.371	.0030	.348	18†	48†	1.656†	1.312†	1.875	3
4	Buick-Century 41-60	T-R	5.250	(a)	1.781	45	N	.375	.0025	.347	18†	48†	1.656†	1.312†	1.875	T-R	5.250	(b)	1.437	45	N	N	.371	.0030	.342	18†	48†	1.656†	1.312†	1.875	4
5	Buick-Roadmaster 41-70	T-R	5.250	(a)	1.781	45	N	.375	.0025	.347	18†	48†	1.656†	1.312†	1.875	T-R	5.250	(b)	1.437	45	N	N	.371	.0030	.342	18†	48†	1.656†	1.312†	1.875	5
6	Buick-Limited 41-90	T-R	5.250	(a)	1.781	45	N	.375	.0025	.347	18†	48†	1.656†	1.312†	1.875	T-R	5.250	(b)	1.437	45	N	N	.371	.0030	.342	18†	48†	1.656†	1.312†	1.875	6
7	Cadillac-V8 61, 62, 63, 60S	.....	.....	3140	1.881	45	N	.342	.0023	.335	63½	145	1.926	1.581	2.210	.....	.....	2112	1.631	45	N	N	.341	.0033	.345	63½	145	1.926	1.581	2.210	7
8	Cadillac-V8 67, 75	.....	.....	3140	1.881	45	N	.342	.0023	.335	63½	145	1.926	1.581	2.210	.....	.....	2112	1.631	45	N	N	.341	.0033	.345	63½	145	1.926	1.581	2.210	8
9	Chevrolet-Special DeL. & Master DeL.	Own	6.218	ES	1.640	30	N	.341	.0030	.294	55	128	1.812	1.500	.....	Own	4.859	ES	1.468	30	N	N	.340	.0030	.312	55	128	1.812	1.500	.....	9
10	Chrysler-Royal & Windsor C-28	.....	4.781	AS	1.656	45	N	.340	.0025	.375	42	111	1.750	1.375	2.000	.....	4.781	Sil-10	1.531	45	Y	.....	.340	.0025	.375	42	111	1.750	1.375	2.000	10
11	Chrysler-New Yorker C30N, 30K	Al	5.875	3140	1.531	45	N	.340	.0025	.375	55	133	2.031	1.656	2.390	Al	5.875	Sil-10	1.343	45	Y	.....	.340	.0025	.375	55	133	2.031	1.656	2.390	11
12	Chrysler-Crown Imperial C33	Al	5.875	3140	1.531	45	N	.340	.0025	.375	55	133	2.031	1.656	2.390	Al	5.875	Sil-10	1.343	45	Y	.....	.340	.0025	.375	55	133	2.031	1.656	2.390	12
13	Crosley CB-41	Al	5.703	3140	1.375	45	N	.311	.0020	.300	20	41	1.500	1.203	1.500	Al	5.734	Dia-9	1.156	45	N	N	.310	.0030	.300	20	41	1.500	1.203	1.500	13
14	De Soto-DeLuxe & Custom S-8	Al	4.781	3140	1.656	45	N	.340	.0025	.375	42	111	1.750	1.375	2.000	.....	4.781	Sil-10	1.531	45	Y	.....	.340	.0025	.375	42	111	1.750	1.375	2.000	14
15	Dodge-DeLuxe & Custom D-19	.....	4.781	.....	1.468	45	N	.340	.0020	.375	42	111	1.750	1.375	2.000	.....	4.781	Sil-XB	1.468	45	Y	.....	.340	.0040	.375	42	111	1.750	1.375	2.000	15
16	Ford-DeLuxe & Super DeLuxe	Own	.....	CNS	1.537	45	Y	.311	.0025	.292	38	78	2.13	.....	.....	Own	.....	CNS	1.537	45	Y	CT	.311	.0025	.292	38	78	2.13	.....	.....	16
17	Hudson-DeLuxe & Traveler 6 10	WR	5.344	3140	1.375	45	N	.341	.0022	.343	40	80	.....	.....	2.343	WR	5.344	Sil-X	1.375	45	N	N	.339	.0040	.343	40	80	.....	.....	2.343	17
18	Hudson-Super & Commodore 6 11-12	WR	5.344	3140	1.375	45	N	.341	.0022	.343	40	80	.....	.....	2.343	WR	5.344	Sil-X	1.375	45	N	N	.339	.0040	.343	40	80	.....	.....	2.343	18
19	Hudson-Commodore 8 14	WR	5.094	3140	1.500	45	N	.343	.0022	.343	40	80	.....	.....	2.343	WR	5.094	Sil-X	1.375	45	N	N	.339	.0040	.343	40	80	.....	.....	2.343	19
20	Hudson-Commodore Custom 8 17	WR	5.094	3140	1.500	45	N	.343	.0022	.343	40	80	.....	.....	2.343	WR	5.094	Sil-X	1.375	45	N	N	.339	.0040	.343	40	80	.....	.....	2.343	20
21	Lincoln-Zephyr & Continental	Own	.....	CNS	1.537	45	N	.311	.0025	.292	54	116	2.13	.....	.....	Own	.....	CNS	1.537	45	Y	CT	.311	.0025	.292	54	116	2.13	.....	.....	21
22	Lincoln-Custom	Own	.....	CNS	1.537	45	N	.311	.0025	.292	54	116	2.13	.....	.....	Own	.....	CNS	1.537	45	Y	CT	.311	.0025	.292	54	116	2.13	.....	.....	22
23	Mercury	Own	.....	CNS	1.537	45	Y	.311	.0025	.292	38	78	2.13	.....	.....	Own	.....	CNS	1.537	45	Y	CT	.311	.0025	.292	38	78	2.13	.....	.....	23
24	Nash-Ambassador 600 4140	.....	4.800	.....	1.343	45	N	.341	.0025	.312	39	83	1.750	1.437	2.093	.....	4.800	.....	1.281	45	N	N	.341	.0025	.312	39	83	1.750	1.437	2.093	24
25	Nash-Ambassador 6 4160	WR	5.500	CNS	1.750	45	N	.372	.0030	.343	38*	95*	1.687*	1.343*	2.000*	WR	5.500	Sil-X	1.593	45	N	N	.372	.0030	.343	38*	95*	1.687*	1.343*	2.000	25
26	Nash-Ambassador 8 4180	WR	5.453	CNS	1.656	45	N	.372	.0030	.343	38*	95*	1.687*	1.343*	2.000*	WR	5.453	Sil-X	1.468	45	N	N	.372	.0030	.343	38*	95*	1.687*	1.343*	2.000	26
27	Oldsmobile-Special 6	.....	5.796	3140	1.562	30	N	.342	.0027	.300	50½	95½	2.250	1.937	2.593	.....	5.796	.....	1.421	45	N	N	.341	.0033	.300	50½	95½	2.250	1.937	2.593	27
28	Oldsmobile-Dynamic 6	.....	5.796	3140	1.562	30	N	.342	.0027	.300	50½	95½	2.250	1.937	2.593	.....	5.796	.....	1.421	45	N	N	.341	.0033	.300	50½	95½	2.250	1.937	2.593	28
29	Oldsmobile-Custom 6	.....	5.796	3140	1.562	30	N	.342	.0027	.300	50½	95½	2.250	1.937	2.593	.....	5.796	.....	1.421	45	N	N	.341	.0033	.300	50½	95½	2.250	1.937	2.593	29
30	Oldsmobile-Special 8	.....	5.796	3140	1.562	30	N	.342	.0027	.300	50½	95½	2.250	1.937	2.593	.....	5.796	.....	1.421	45	N	N	.341	.0033	.300	50½	95½	2.250	1.937	2.593	30
31	Oldsmobile-Dynamic 8	.....	5.796	3140	1.562	30	N	.342	.0027	.300	50½	95½	2.250	1.937	2.593	.....	5.796	.....	1.421	45	N	N	.341	.0033	.300	50½	95½	2.250	1.937	2.593	31
32	Oldsmobile-Custom 8	.....	5.796	3140	1.562	30	N	.342	.0027	.300	50½	95½	2.250	1.937	2.593	.....	5.796	.....	1.421	45	N	N	.341	.0033	.300	50½	95½	2.250	1.937	2.593	32
33	Packard-One Ten 1900	WR	5.515	CNS	1.593	30	.....	.339	.0025	.318	49	119	1.625	1.312	.....	WR	5.515	Sil-X	1.375	45	.....	.....	.339	.0045	.317	49	119	1.625	1.312	.....	33
34	Packard-One Twenty 1901	WR	5.515	CNS	1.484	30	.....	.339	.0025	.318	49	119	1.625	1.312	.....	WR	5.515	Sil-X	1.375	45	.....	.....	.339	.0045	.317	49	119	1.625	1.312	.....	34
35	Packard-Super Eight 1903-4-5	WR	6.109	CNS	1.687	30	.....	.339	.0025	.340	58	135	1.750	1.406	.....	WR	6.109	Sil-X	1.437	45	.....	.....	.339	.0045	.340	58	135	1.750	1.406	.....	35
36	Packard-Custom Super Eight 1906-7-8	WR	6.109	CNS	1.687	30	.....	.339	.0025	.340	58	135	1.750	1.406	.....	WR	6.109	Sil-X	1.437	45	.....	.....	.339	.0045	.340	58	135	1.750	1.406	.....	36
37	Plymouth P-11	.....	4.781	AS	1.468	45	N	.340	.0020	.375	42	111	1.750	1.375	2.000	.....	4.781	Sil-XB	1.468	45	Y	.....	.340	.0040	.375	42	111	1.750	1.375	2.000	37
38	Plymouth-Special DeLuxe P-12	.....	4.781	AS	1.468	45	N	.340	.0020	.375	42	111	1.750	1.375	2.000	.....	4.781	Sil-XB	1.468	45	Y	.....	.340	.0040	.375	42	111	1.750	1.375	2.000	38
39	Pontiac-DeLuxe 6 41-25	Own	5.718	.....	1.593	30	N	.312	FF	.296	59	101	1.906	1.593	.....	Own	5.718	.....	1.468	45	N	N	.312	FF	.296	59	101	1.906	1.593	.....	39
40	Pontiac-Streamliner 6 41-26	Own	5.718	.....	1.593	30	N	.312	FF	.296	59	101	1.906	1.593	.....	Own	5.718	.....	1.468	45	N	N	.312	FF	.296	59	101	1.906	1.593	.....	40
41	Pontiac-Custom 6 41-24	Own	5.718	.....	1.593	30	N	.312	FF	.296	59	101	1.906	1.593	.....	Own	5.718	.....	1.468	45	N	N	.312	FF	.296	59	101	1.906	1.593	.....	41
42	Pontiac-DeLuxe 8 41-27	Own	5.531	.....	1.468	30	N	.312	FF	.296	59	101	1.906	1.593	.....	Own	5.531	.....	1.343	45	N	N	.312	FF	.296	59	101	1.906	1.593	.....	42
43	Pontiac-Streamliner 8 41-28	Own	5.531	.....	1.468	30	N	.312	FF	.296	59	101	1.906	1.593	.....	Own	5.531	.....	1.343	45	N	N	.312	FF	.296	59	101	1.906	1.593	.....	43
44	Pontiac-Custom 8 41-29	Own	5.531	.....	1.468	30	N	.312	FF	.296	59	101	1.906	1.593	.....	Own	5.531	.....	1.343	45	N	N	.312	FF	.296	59	101	1.906	1.593	.....	44
45	Studebaker-Champion 3G	A-R	4.343	CNS	1.343	45	N	.312	.0022	.312	51	92	1.656	1.343	2.093	A-R	4.343	2112	1.281	45	N	N	.312	.0025	.312	51	92	1.656	1.343	2.093	45
46	Studebaker-Commander 6 11A	WR	5.218	CNS	1.468	45	N	.343	.0025	.343	57	130	2.093	1.750	2.500	WR	5.218	Sil-1	1.281	45	N	N	.343	.0025	.343	57	130	2.093	1.750	2.500	46
47	Studebaker-President 8 7C	WR	5.218	CNS	1.406	45	N	.343	.0020	.343	57	130	2.093	1.750	2.500	WR	5.218	Sil-1	1.281	45	N	N	.343	.0020	.343	57	130	2.093	1.750	2.500	47
48	Willys-Americar 441	A-R	5.750	3140	1.531	45	N	.373	.0024	.351	50	116	2.109	1.750	2.500	A-R	5.750	CNS	1.468	45	N	N	.372	.0029	.351	50	116	2.109	1.750	2.500	48

ABBREVIATIONS:

*—Outer only
Inner—21 lbs.; 1¾ inches, valve closed
51 lbs.; 1⅛ inches, valve open
Out of engine 1²¹⁄₃₂ inches

†—Inner only
Outer—29 lbs.; 1¹³⁄₁₆ inches, valve closed
70 lbs.; 1¹³⁄₁₆ inches, valve open
(a)—3140 or 1050
(b)—X.B. or 2112W

Al—Aluminum Industries, Inc.
A-R—Aluminum Industries or Wilcox-Rich Division
AS—Various Alloy Steels
CT—Chrome Tungsten Steel

CNS—Chrome Nickel Alloy Steel
Dia—Diachrome
ES—Extruded Steel
FF—Free Fit to .0006 Maximum
N—No

Sil—Silchrome
T-R—Thompson Products or Wilcox-Rich Division
W-R—Wilcox-Rich Division
Y—Yes

Timing Gears, Valve Timing and Lubrication

Line Numbers	PASSENGER CAR MAKE AND MODEL	CRANKSHAFT GEAR OR SPROCKET: Make	CRANKSHAFT GEAR OR SPROCKET: Material	CAMSHAFT GEAR OR SPROCKET: Make	CAMSHAFT GEAR OR SPROCKET: Material	TIMING CHAIN: Make	TIMING CHAIN: Number of Links	TIMING CHAIN: Width (In.)	TIMING CHAIN: Pitch	TIMING CHAIN: Adjustment	VALVE TAPPET CLEARANCE (Inches): Intake: Operating	VALVE TAPPET CLEARANCE (Inches): Intake: Timing	VALVE TAPPET CLEARANCE (Inches): Exhaust: Operating	VALVE TAPPET CLEARANCE (Inches): Exhaust: Timing	Hydraulic Valve Lifters	VALVE TIMING (Degrees): Intake: Open	VALVE TIMING (Degrees): Intake: Closed	VALVE TIMING (Degrees): Exhaust: Open	VALVE TIMING (Degrees): Exhaust: Closed	LUBRICATION: Type	LUBRICATION: Oil Pressure to: Main Bearings	LUBRICATION: Oil Pressure to: Connecting Rods	LUBRICATION: Oil Pressure to: Wristpins	LUBRICATION: Oil Pressure to: Camshaft Bearings	LUBRICATION: Pump Type	LUBRICATION: Normal Oil Pressure Lbs. at M.P.H.	LUBRICATION: Relief Valve Opens—Lbs. Pressure	LUBRICATION: Crankcase Capacity Dry—(Qts.)	LUBRICATION: Oil Pressure Gage—Make	LUBRICATION: Floating Type Oil Intake	LUBRICATION: External Oil Filter—Make	LUBRICATION: Oil Cooler Make	Line Numbers
1	Bantam 65	Own	CI	Own	CI	No	No	No	No	No	.011H	.011	.012H	.011	N	19BT	50AB	57BB	12AT	P	Y	Y	N	Y	Ge	30–50		3	SW	No	No	No	1
2	Buick-Special 41-40	LB	1112	LB	CI	LB	49	1	½	No	.015H	††	.015H	††	N	13BT	68AB	55BB	22AT	P	Y	Y	N	Y	Ge	45–35	45	8	AC	Yes	AC	No	2
3	Buick-Super 41-50	LB	1112	LB	CI	LB	49	1	½	No	.015H	††	.015H	††	N	13BT	68AB	55BB	22AT	P	Y	Y	N	Y	Ge	45–35	45	8	AC	Yes	AC	No	3
4	Buick-Century 41-60	LB	1112	LB	CI	LB	50	1	½	No	.015H	††	.015H	††	N	14BT	71AB	56BB	25AT	P	Y	Y	N	Y	Ge	45–35	45	10	AC	Yes	AC	No	4
5	Buick-Roadmaster 41-70	LB	1112	LB	CI	LB	50	1	½	No	.015H	††	.015H	††	N	14BT	71AB	56BB	25AT	P	Y	Y	N	Y	Ge	45–35	45	10	AC	Yes	AC	No	5
6	Buick-Limited 41-90	LB	1112	LB	CI	LB	50	1	½	No	.015H	††	.015H	††	N	14BT	71AB	56BB	25AT	P	Y	Y	N	Y	Ge	45–35	45	10	AC	Yes	AC	No	6
7	Cadillac-V8 61, 62, 63, 60S	LB	1120	LB	CI	LB	62	1¼	⅜	No	HA	HA	HA	HA	Y	TC	42AB	52BB	10AT	P	Y	Y	Y	Y	Ge	25–30	30	7	AC	.....	AC†	No	7
8	Cadillac-V8 67, 75	LB	1120	LB	CI	LB	62	1¼	⅜	No	HA	HA	HA	HA	Y	TC	42AB	52BB	10AT	P	Y	Y	Y	Y	Ge	25–30	30	7	AC	.....	AC†	No	8
9	Chevrolet-Special DeL. & Master DeL.	Own	Steel	CD	Cel	No	No	No	No	No	.006H	.006H	.013H	.013H	N	3BT	35AB	46BB	5AT	P	Y	Y	N	Y	Ge	14–21	15	5½	AC	No	AC†	No	9
10	Chrysler-Royal & Windsor C-28	Mor	HMS	Mor	CI	Mor	48	1	½	No	.008H	.014	.010H	.014	N	12BT	44AB	50BB	6AT	P	Y	Y	N	Y	Gr	.....	42	5	.....	.....	Pur	.....	10
11	Chrysler-New Yorker C30N, 30K	Whit	HMS	Whit	CI	Whit	47	1¼	½	No	.008H	.011	.010H	.014	N	6BT	50AB	44BB	12AT	P	Y	Y	N	Y	Gr	.....	42	6	.....	.....	Pur	.....	11
12	Chrysler-Crown Imperial C33	Whit	HMS	Whit	CI	Whit	47	1¼	½	No	.008H	.011	.010H	.014	N	6BT	50AB	44BB	12AT	P	Y	Y	N	Y	Gr	.....	42	6	.....	.....	Pur	.....	12
13	Crosley CB-41	.....	1340	.....	For	No	No	No	No	No	.006C	.....	.008C	.....	N	20BT	60AB	60BB	20AT	P	Y	Y	N	Y	Va	50–35	.....	3	AC	No	No	No	13
14	De Soto-DeLuxe & Custom S-8	Mor	HMS	Mor	CI	Mor	48	1	½	No	.008H	.014	.008H	.014	N	12BT	44AB	50BB	6AT	P	Y	Y	N	Y	Ge	.....	42	5	.....	.....	Pur	.....	14
15	Dodge-DeLuxe & Custom D-19	Mor	HMS	Mor	CI	Mor	48	1	½	No	.008H	.014	.010H	.014	N	9BT	47AB	47BB	9AT	P	Y	Y	N	Y	Ge	.....	42	5	.....	.....	Pur	.....	15
16	Ford-DeLuxe & Super DeLuxe	Own	Steel	CD	Cel	No	No	No	No	No	.011C	.....	.011C	.....	N	TC	44AB	48BB	6AT	P	Y	Y	N	Y	Ge	(a)	.....	5	KS	.....	.....	.....	16
17	Hudson-DeLuxe & Traveler 6 10	Own	CI	CD	Bak	No	No	No	No	No	.006H	.....	.008H	.....	N	10°BT	60AB	50BB	18°AT	SP	N	N	N	N	OP	3–	3	6	Own	No	No	.....	17
18	Hudson-Super & Commodore 6 11-12	Own	CI	CD	Bak	No	No	No	No	No	.006H	.....	.008H	.....	N	10°BT	60AB	50BB	18°AT	SP	N	N	N	N	OP	3–	3	6	Own	No	No	.....	18
19	Hudson-Commodore 8 14	Own	CI	CD	Bak	No	No	No	No	No	.006H	.....	.008H	.....	N	10°BT	60AB	50BB	18°AT	SP	N	N	N	N	OP	3–	3	9	Own	No	No	.....	19
20	Hudson-Commodore Custom 8 17	Own	CI	CD	Bak	No	No	No	No	No	.006H	.....	.008H	.....	N	10°BT	60AB	50BB	18°AT	SP	N	N	N	N	OP	3–	3	9	Own	No	No	.....	20
21	Lincoln-Zephyr & Continental	Own	Steel	Own	Al	No	No	No	No	No	HA	HA	HA	HA	Y	10°BT	36AB	51BB	8AT	P	Y	Y	N	Y	Ge	(b)	.....	5	KS	.....	.....	.....	21
22	Lincoln-Custom	Own	Steel	Own	Al	No	No	No	No	No	HA	HA	HA	HA	Y	10°BT	36AB	51BB	8AT	P	Y	Y	N	Y	Ge	(b)	.....	5	KS	.....	.....	.....	22
23	Mercury	Own	Steel	Own	Al	No	No	No	No	No	.012C	.012	.012C	.012	N	TC	44AB	48BB	6AT	P	Y	Y	N	Y	Ge	(a)	.....	5	KS	.....	.....	.....	23
24	Nash-Ambassador 600 4140	Own	Steel	Own	CI	Whit	60	9/16	⅜	No	.015	.019	.015	.019	N	6BT	50AB	46BB	10AT	P	Y	Y	Y	Y	Ge	35–20	50	5	AL	No	No	No	24
25	Nash-Ambassador 6 4160	Own	Steel	Own	CI	Whit	60	9/16	⅜	No	.015	.015	.015	.015	N	24½BT	70½AB	49½BB	5AT	P	Y	Y	Y	Y	Ge	30–20	30	6	AL	No	Pur	No	25
26	Nash-Ambassador 8 4180	Own	Steel	Own	CI	.....	62	9/16	⅜	No	.015	.015	.015	.015	N	20BT	74AB	45BB	10AT	P	Y	Y	Y	Y	Ge	30–20	30	7	.....	.....	Pur	No	26
27	Oldsmobile-Special 6	Whit	1314	Whit	CI	Whit	47	1	½	No	.008H	.012	.011H	.015	N	5BT	45AB	45BB	5AT	P	Y	Y	Y	Y	Ge	30–	30	5	AC	No	AC†	No	27
28	Oldsmobile-Dynamic 6	Whit	1314	Whit	CI	Whit	47	1	½	No	.008H	.012	.011H	.015	N	5BT	45AB	45BB	5AT	P	Y	Y	Y	Y	Ge	30–	30	5	AC	No	AC†	No	28
29	Oldsmobile-Custom 6	Whit	1314	Whit	CI	Whit	47	1	½	No	.008H	.012	.011H	.015	N	5BT	45AB	45BB	5AT	P	Y	Y	Y	Y	Ge	30–	30	5	AC	No	AC†	No	29
30	Oldsmobile-Special 8	LB	1315	LB	CI	LB	47	11/16	½	No	.008H	.012	.011H	.015	N	TC	35AB	45BB	10AT	P	Y	Y	Y	Y	Ge	30–	30	6	AC	No	AC†	No	30
31	Oldsmobile-Dynamic 8	LB	1315	LB	CI	LB	47	11/16	½	No	.008H	.012	.011H	.015	N	TC	35AB	45BB	10AT	P	Y	Y	Y	Y	Ge	30–	30	6	AC	No	AC†	No	31
32	Oldsmobile-Custom 8	LB	1315	LB	CI	LB	47	11/16	½	No	.008H	.012	.011H	.015	N	TC	35AB	45BB	10AT	P	Y	Y	Y	Y	Ge	30–	30	6	AC	No	AC†	No	32
33	Packard-One Ten 1900	Own	Steel	Own	CI	M-R	58	1¼	⅝	No	.007H	.012	.010H	.015	N	1BT	39AB	45BB	5AT	P	Y	Y	Y	Y	Ge	40–	.....	5	.....	Yes	†	.....	33
34	Packard-One Twenty 1901	Own	Steel	Own	CI	M-R	58	1¼	⅝	No	.007H	.012	.010H	.015	N	1BT	39AB	45BB	5AT	P	Y	Y	Y	Y	Ge	40–	.....	6	.....	Yes	†	.....	34
35	Packard-Super Eight 1903-4-5	Own	Steel	Own	CI	M-R	62	1¼	⅝	No	HA	HA	HA	HA	Y	4BT	51AB	49BB	10AT	P	Y	Y	Y	Y	Ge	40–	.....	7	.....	Yes	Pur	.....	35
36	Packard-Custom Super Eight 1906-7-8	Own	Steel	Own	CI	M-R	62	1¼	⅝	No	HA	HA	HA	HA	Y	4BT	51AB	49BB	10AT	P	Y	Y	Y	Y	Ge	40–	.....	7	.....	Yes	Pur	.....	36
37	Plymouth P-11	Mor	HMS	Mor	CI	Mor	48	1	½	No	.008H	.014	.010H	.014	N	9BT	47AB	47BB	9AT	P	Y	Y	N	Y	Ge	.....	42	5	.....	Yes	Pur	.....	37
38	Plymouth-Special DeLuxe P-12	Mor	HMS	Mor	CI	Mor	48	1	½	No	.008H	.014	.010H	.014	N	9BT	47AB	47BB	9AT	P	Y	Y	N	Y	Ge	.....	42	5	.....	Yes	Pur	.....	38
39	Pontiac-DeLuxe 6 41-25	Own	Steel	Own	CNS	Mor	56	1	⅝	No	.012H	.015	.012H	.015	N	5BT	39AB	45BB	5AT	P	Y	Y	Y	Y	Ge	37–45	40	6	AC	No	AC†	.....	39
40	Pontiac-Streamliner 6 41-26	Own	Steel	Own	CNS	Mor	56	1	⅝	No	.012H	.015	.012H	.015	N	5BT	39AB	45BB	5AT	P	Y	Y	Y	Y	Ge	37–45	40	6	AC	No	AC†	.....	40
41	Pontiac-Custom 6 41-24	Own	Steel	Own	CNS	Mor	56	1	⅝	No	.012H	.015	.012H	.015	N	5BT	39AB	45BB	5AT	P	Y	Y	Y	Y	Ge	37–45	40	6	AC	No	AC†	.....	41
42	Pontiac-DeLuxe 8 41-27	Own	Steel	Own	CNS	Mor	56	⅞	⅝	No	.012H	.015	.012H	.015	N	5BT	39AB	45BB	5AT	P	Y	Y	Y	Y	Ge	37–45	40	6	AC	No	AC†	.....	42
43	Pontiac-Streamliner 8 41-28	Own	Steel	Own	CNS	Mor	56	⅞	⅝	No	.012H	.015	.012H	.015	N	5BT	39AB	45BB	5AT	P	Y	Y	Y	Y	Ge	37–45	40	6	AC	No	AC†	.....	43
44	Pontiac-Custom 8 41-29	Own	Steel	Own	CNS	Mor	56	⅞	⅝	No	.012H	.015	.012H	.015	N	5BT	39AB	45BB	5AT	P	Y	Y	Y	Y	Ge	37–45	40	6	AC	No	AC†	.....	44
45	Studebaker-Champion 3G	Own	CI	CD	Cel	No	No	No	No	No	.016C	.020	.016C	.020	N	15BT	49AB	54BB	10AT	P	Y	Y	N	Y	Ge	40–25	40	5	MM	No	No	No	45
46	Studebaker-Commander 6 11A	Own	CI	CD	Cel	No	No	No	No	No	.016C	.020	.016C	.020	N	15BT	49AB	54BB	10AT	P	Y	Y	N	Y	Ge	40–25	40	6	MM	No	Fram	No	46
47	Studebaker-President 8 7C	Own	CI	CD	Cel	No	No	No	No	No	.016C	.020	.016C	.020	N	15BT	49AB	54BB	10AT	P	Y	Y	N	Y	Ge	40–25	40	8	MM	Yes	Fram	No	47
48	Willys-Americar 441	LB	Steel	LB	Steel	LB	47	1	½	No	.014C	.020	.014C	.020	N	9BT	50AB	47BB	12AT	P	Y	Y	N	Y	Ge	40–30	40	4	KS	Yes	No	No	48

ABBREVIATIONS:

†—At extra cost
††—With valve .004 in. off seat the clearance is .015 in.
(a)—30 at 2000 R.P.M.
(b)—40-50 at 2000 R.P.M.
AB—After bottom center
AC—AC Spark Plug Division
Al—Aluminum Alloy
AL—The Electric Auto-Lite Co
AT—After top center **Bak**—Bakelite
BB—Before bottom center
BT—Before top center **C**—Cold
CD—Continental Diamond Fibre Co.
Cel—Celeron with Steel Hub
CI—Cast Iron
CNS—Chrome Nickel Alloy Steel
For—Formica Insulation Co.
Ge—Gear
Gr—Gear Driven Rotary
H—Hot
HA—Hydraulic Automatic Adjustment
HMS—High Manganese Steel
KS—King-Seeley Corp.
LB—Link-Belt Co.
MM—Moto-Meter
Mor—Morse Chain Co.
M-R—Morse Chain Co. or Ramsey Chain Co,
N—No
No—No or None
OP—Oscillating Plunger
P—Pressure
Pur—Purolator-Motor Improvements, Inc.
SP—Splash
SW—Stewart-Warner Corp.
TC—Top center
Va—Vane
Var—Various
Whit—Whitney Chain and Mfg. Co.
Y—Yes

Fuel and Cooling Systems

Line Numbers	PASSENGER CAR MAKE AND MODEL	FUEL SYSTEMS: Tank Capacity (Gal.)	FEED: Type	FEED: Make	CARBURETOR: Make	CARBURETOR: Model No.	CARBURETOR: Size	CARBURETOR: Type	Manifold Heat Control	Automatic Choke—Make	Air Cleaner—Make	Muffler—Make	COOLING SYSTEM: WATER PUMP Type	WATER PUMP Drive	WATER PUMP Packing Nut	Thermostat—Make	Pressure Relief Valve	By-pass for Recirculation	RADIATOR CORE Type	RADIATOR CORE Make	System Capacity (Qts.)	Full Length Water Jackets	LOWER HOSE Inside Diameter (In.)	LOWER HOSE Length (In.)	UPPER HOSE Inside Diameter (In.)	UPPER HOSE Length (In.)	FAN BELT Make	FAN BELT Angle of Vee (Deg.)	FAN BELT Length—Outside (In.)	FAN BELT Width—Max. (In.)	Fan—Make	Line Number
1	Bantam 65	5	Gra	....	Zen	61A5	13/16	SU	No	No	AC	McK	No	No	No	No	No	No	TF	Jam	5½	No	1¼	9⅜	1¼	1¼	Go	42	29⅜	⅝	S-C	1
2	Buick-Special 41-40	18	CP	AC	S-C	(a)	1	DD	Aut	S-C	AC	Hay	Ce	FB	No	Har	Yes	Yes	Cel	Har	13	No	1 1/16	ET	1 1/16	ET	Var	.....	.....	.....	Hay	2
3	Buick-Super 41-50	18	CP	AC	S-C	(b)	1	DD	Aut	S-C	AC	Hay	Ce	FB	No	Har	Yes	Yes	Cel	Har	13	No	1 1/16	ET	1 1/16	ET	Var	.....	.....	.....	Hay	3
4	Buick-Century 41-60	18	CP	AC	S-C	(c)	1	DD	Aut	S-C	AC	Hay	Ce	FB	No	Har	Yes	Yes	Cel	Har	16⅜	No	1 1/16	ET	1 1/16	ET	Var	.....	.....	.....	Hay	4
5	Buick-Roadmaster 41-70	18	CP	AC	S-C	(c)	1	DD	Aut	S-C	AC	Hay	Ce	FB	No	Har	Yes	Yes	Cel	Har	16⅜	No	1 1/16	ET	1 1/16	ET	Var	.....	.....	.....	Hay	5
6	Buick-Limited 41-90	18	CP	AC	S-C	(c)	1	DD	Aut	S-C	AC	Hay	Ce	FB	No	Har	Yes	Yes	Cel	Har	18	No	1 1/16	ET	1 1/16	ET	Var	.....	.....	.....	Hay	6
7	Cadillac-V8 61, 62, 63, 60S	20	CP	AC	Str	AAV-26	1¼	DD	No	Str	AC	Wal	Ce	FB	Yes	No	.....	No	TF	Har	25	Yes	2	ET	1¼	(d)	Var	34	34 3/32	1¼	Hay	7
8	Cadillac-V8 67, 75	24	CP	AC	Str	AAV-26	1¼	DD	No	Str	AC	Wal	Ce	FB	Yes	No	.....	No	TF	Har	25	Yes	2	ET	1¼	(d)	Var	34	34 3/32	1¼	Hay	8
9	Chevrolet-Spec. DeL. & Mas. DeL.	16	CP	AC	Car	W1-483S	1⅛	SD	Aut	No	AC	Var	Ce	FB	No	Har	No	No	Cel	Har	14	Yes	1½	4	1¼	5⅝	Var	32	42⅞	11/16	Own	9
10	Chrys.-Roy. & Windsor C-28	17	CP	AC	Car	BB-E6W1	1½	SD	Aut	Sis	AC	.....	Ce	FB	.....	.....	No	Yes	Cel	Jam	18	Yes	1¾	6	1½	9¼	.....	40	48⅛	¾	.....	10
11	Chrysler-New Yorker C30N, 30K	20	CP	AC	Str	AAV-2	1¼	DD	Aut	Str	AC	.....	Ce	FB	.....	.....	Yes	Yes	TF	Jam	24	Yes	1¾	7¾	1¾	5½	.....	40	48⅛	¾	.....	11
12	Chrysler-Crown Imperial C33	20	CP	AC	Str	AAV-2	1¼	DD	Aut	Str	AC	.....	Ce	FB	.....	.....	Yes	Yes	TF	Jam	24	Yes	1¾	7¾	1¾	5½	.....	40	48⅛	¾	.....	12
13	Crosley CB-41	6	CP	AC	Til	DY-1A	⅞	SD	No	No	AC	Own	(e)	(e)	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	Wau	13
14	De Soto-DeLuxe & Custom S-8	17	CP	AC	Car	BB-E6N3	1½	SD	Aut	Sis	AC	.....	Ce	FB	.....	.....	No	Yes	Cel	Jam	18	Yes	1¾	6	1½	9¼	.....	40	48⅛	¾	.....	14
15	Dodge-DeLuxe & Custom D-19	.....	CP	AC	Str	BXV-3	1¼	DD	Aut	Str	AC	.....	Ce	FB	.....	.....	No	Yes	Cel	Fed	15	Yes	1¾	6	1½	9¼	.....	40	48⅛	¾	.....	15
16	Ford-DeLuxe & Super DeLuxe	17	CP	AC	Own	.....	.94*	DD	Aut	No	.....	Own	Ce	GB	.....	Own	.....	.....	TF	Own	23¾	Yes	1¾	.....	1¾	.....	.....	28	51.3†	.63	.....	16
17	Hudson-DeLuxe & Traveler 6..10	12½	CP	AC	Car	WA1-454S	1¼	SD	Man	Car	AC	Old	Ce	FB	No	Ful	No	No	Cel	McC	13	No	1⅝	8½	1½	10	Go-G	46	44.6	.79	Own	17
18	Hudson-Super & Comm. 6..11-12	16½	CP	AC	Car	WDO-501S	1	DD	Aut	Car	Uni	Old	Ce	FB	No	Ful	No	No	Cel	McC	13	No	1⅝	8½	1½	10	Go-G	46	44.6	.79	Own	18
19	Hudson-Commodore 8 14	16½	CP	AC	Car	WDO-502S	1¼	DD	Aut	Car	Uni	Old	Ce	FB	No	Ful	No	No	Cel	McC	18	No	1⅝	10	1½	7¾	Go-G	46	44.6	.79	Own	19
20	Hudson-Comm. Custom 8 17	16½	CP	AC	Car	WDO-502S	1¼	DD	Aut	Car	Uni	Old	Ce	FB	No	Ful	No	.....	Cel	McC	18	No	1⅝	10	1½	7¾	Go-G	46	44.6	.79	Own	20
21	Lincoln-Zephyr & Continental	19½	CP	AC	Own	.....	1*	DD	Aut	No	.....	Own	Ce	GB	.....	Own	.....	.....	TF	Own	27	Yes	1¾	.....	1¾	.....	.....	28	53.4†	.63	Own	21
22	Lincoln-Custom	19½	CP	AC	Own	.....	1*	DD	Aut	No	.....	Own	Ce	GB	.....	Own	.....	.....	TF	Own	27	Yes	1¾	.....	1¾	.....	.....	28	53.4†	.63	Own	22
23	Mercury	17	CP	AC	Own	.....	.94*	DD	Aut	No	.....	Own	Ce	GB	.....	Own	.....	.....	TF	Own	23¾	Yes	1¾	.....	1¾	.....	.....	28	51.3†	.63	Own	23
24	Nash-Ambassador 600 4140	20	CV	AC	Car	BBR1-513S	1¼	SD	Aut	No	AC	Wal	Ce	GB	Yes	Ful	No	No	TF	McC	14	Yes	.....	.....	.....	.....	.....	32	.....	.....	S-C	24
25	Nash-Ambassador 6 4160	20	CV	AC	Car	WA1-435S	1¼	SD	Aut	Car	AC	Wal	Ce	GB	Yes	Ful	No	No	TF	McC	17	Yes	.....	.....	.....	.....	.....	32	42 1/16	.....	S-C	25
26	Nash-Ambassador 8 4180	20	CP	AC	Car	WDO-511S	1⅛	DD	Aut	Car	AC	Wal	Ce	GB	Yes	Ful	No	.....	TF	McC	16	Yes	.....	.....	.....	.....	.....	32	45	.....	S-C	26
27	Oldsmobile-Special 6	19	CP	AC	Car	WA1-504S	1½	SD	Aut	Car	AC	Hay	Ce	FB	No	Har	No	Yes	Cel	Har	18	Yes	1¾	13	1½	8	Var	32	44 1/16	.....	Own	27
28	Oldsmobile-Dynamic 6	19	CP	AC	Car	WA1-504S	1½	SD	Aut	Car	AC	Hay	Ce	FB	No	Har	No	Yes	Cel	Har	18	Yes	1¾	13	1½	8	Var	32	44 1/16	.....	Own	28
29	Oldsmobile-Custom 6	19	CP	AC	Car	WA1-504S	1½	SD	Aut	Car	AC	Hay	Ce	FB	No	Har	No	Yes	Cel	Har	18	Yes	1¾	13	1½	8	Var	32	44 1/16	.....	Own	29
30	Oldsmobile-Special 8	19	CP	AC	Car	WDO-503S	1⅛	DD	Aut	Car	AC	Hay	Ce	FB	No	Har	No	Yes	Cel	Har	22	Yes	1¾	13¾	1½	8	Var	32	44 1/16	.....	Own	30
31	Oldsmobile-Dynamic 8	19	CP	AC	Car	WDO-503S	1⅛	DD	Aut	Car	AC	Hay	Ce	FB	No	Har	No	Yes	Cel	Har	22	Yes	1¾	13¾	1½	8	Var	32	44 1/16	.....	Own	31
32	Oldsmobile-Custom 8	19	CP	AC	Car	WDO-503S	1⅛	DD	Aut	Car	AC	Hay	Ce	FB	No	Har	No	Yes	Cel	Har	22	Yes	1¾	13¾	1½	8	Var	32	44 1/16	.....	Own	32
33	Packard-One Ten 1900	17	CP	AC	Str	BXOV-26	1¼	SD	Aut	.....	AC	.....	Ce	FB	.....	.....	Yes	.....	Cel	Har	15	No	1¾	15⅛	1¾	3	.....	42	49¼	¾	.....	33
34	Packard-One Twenty 1901	20	CP	AC	Car	WDO-478S	1	DD	Aut	Car	AC	Wal	Ce	FB	.....	.....	Yes	.....	TF	McC	17	No	1¾	15⅛	1¾	3	.....	42	49¼	¾	.....	34
35	Packard-Super Eight 1903-4-5	20	CP	AC	Str	AAV-26	1¼	DD	Aut	.....	AC	Wal	Ce	FB	.....	.....	Yes	.....	TF	McC	20	No	1¾	13⅝	1¾	3	.....	42	52¼	1	.....	35
36	Packard-Cus. Sup. Eight 1906-7-8	20	CP	AC	Str	AAV-26	1¼	DD	Aut	.....	AC	Wal	Ce	FB	.....	.....	Yes	.....	TF	McC	20	No	1¾	13⅝	1¾	3	.....	42	52¼	1	.....	36
37	Plymouth P-11	17	CP	AC	Car	BB-D6C2	1½	SD	Aut	Sis	AC	.....	Ce	FB	.....	.....	No	No	Cel	Fed	14	Yes	1⅜	9½	1½	8¾	.....	40	48⅛	¾	.....	37
38	Plymouth-Special DeLuxe P-12	17	CP	AC	Car	BB-D6C2	1½	SD	Aut	Sis	AC	.....	Ce	FB	.....	.....	No	Yes	Cel	Jam	14	Yes	1⅜	8	1½	8¾	.....	40	48⅛	¾	.....	38
39	Pontiac-DeLuxe 6 41-25	17	CP	AC	Car	WA1-494S	1⅜	SD	Aut	Car	AC	Var	Ce	FB	No	Har	Yes	Yes	Cel	Har	18	Yes	1½	16½	1⅜	13½	Var	32	48¼	¾	Own	39
40	Pontiac-Streamliner 6 41-26	17	CP	AC	Car	WA1-494S	1⅜	SD	Aut	Car	AC	Var	Ce	FB	No	Har	Yes	Yes	Cel	Har	18	Yes	1½	16½	1⅜	13½	Var	32	48¼	¾	Own	40
41	Pontiac-Custom 6 41-24	17	CP	AC	Car	WA1-494S	1⅜	SD	Aut	Car	AC	Var	Ce	FB	No	Har	Yes	Yes	Cel	Har	18	Yes	1½	16½	1⅜	13½	Var	32	48¼	¾	Own	41
42	Pontiac-DeLuxe 8 41-27	17	CP	AC	Car	WDO-469S	1⅛	DD	Aut	Car	AC	Var	Ce	FB	No	Har	Yes	Yes	Cel	Har	19½	Yes	1½	13⅛	1⅜	8½	Var	32	48¼	¾	Own	42
43	Pontiac-Streamliner 8 41-28	17	CP	AC	Car	WDO-469S	1⅛	DD	Aut	Car	AC	Var	Ce	FB	No	Har	Yes	Yes	Cel	Har	19½	Yes	1½	13⅛	1⅜	8½	Var	32	48¼	¾	Own	43
44	Pontiac-Custom 8 41-29	17	CP	AC	Car	WDO-469S	1⅛	DD	Aut	Car	AC	Var	Ce	FB	No	Har	Yes	Yes	Cel	Har	19½	Yes	1½	13⅛	1⅜	8½	Var	32	48¼	¾	Own	44
45	Studebaker-Champion 3G	15	CP	AC	Car	WA1-496S	1⅛	SD	Aut	Car	AC	Wal	Ce	FB	No	BB	No	No	Cel	McC	10½	Yes	1¼	ET	1¼	8¼	Ga	45	38¼	11/16	H-S	45
46	Studebaker-Commander 6 11A	18	CP	AC	Str	BKOV-26	1¼	SD	Aut	Str	AC	Wal	Ce	FB	Yes	F-B	No	Yes	TF	McC	13	Yes	1¾	ET	1¼	11½	Ga	45	47⅞	¾	Hay	46
47	Studebaker-President 8 7C	18	CP	AC	Str	AAV-26	1¼	DD	Aut	Str	AC	Wal	Ce	FB	No	Ful	No	No	TF	McC	15	Yes	1¾	ET	1¼	12½	Ga	45	47⅞	¾	Hay	47
48	Willys-Americar 441	11½	CP	AC	Car	WO-507S	1⅛	SD	Aut	No	AC	McK	Ce	FB	No	Har	No	No	Cel	Jam	11¾	Yes	1 1/16	9	1½	10	Th	42	44 33/32	¾	Hay	48

ABBREVIATIONS:

•—Venturi Size
†—Inside Length
‡—Pitch Circumference
(a)—Stromberg—AAV-16; Carter—WCD-487S
(b)—Front—WCD-509S; Rear—WCD-510S—Carter
Front—AAV-16; Rear—AA-1—Stromberg
(c)—Front—WCD-490S; Rear—491S—Carter
Front—AAV-16: Rear—AA-1—Stromberg
(d)—R.H. 9½", L.H. 8½"
(e)—Air cooled by means of blower integral with flywheel
AC—AC Spark Plug Co.
Aut—Automatic
BB—Bishop & Babcock
Car—Carter Carburetor Co.
Ce—Centrifugal Pump
Cel—Cellular
CP—Camshaft Pump
CV—Camshaft Vacuum Pump
DD—Dual Downdraft
ET—Elbow Type
FB—Fan Belt
F-B—Fulton or Bishop & Babcock
Fed—Fedders Mfg. Co.
Ful—Fulton Sylphon
Ga—Gates Rubber Company
GB—Generator Drive Belt
Go—Goodrich Rubber Co.
Go-G—Goodrich or Gates Rubber Co.
Gra—Gravity
Har—Harrison Radiator Div.
Hay—Hayes Industries
H-S—Hayes or Schweitzer-Cummins
Jam—Jamestown Radiator Co.
Man—Manual
McC—McCord Radiator Co.
McK—MacKenzie Muffler Co.
No—Non or None
Old—Oldberg Manufacturing Co.
S-C—Schweitzer-Cummins
SD—Single Downdraft
Sis—Sisson-Pierce Governor Co.
Str—Stromberg Carburetor Div.
SU—Single, Updraft
TF—Tube and Fin
Th—Thermoid Rubber Co.
Til—Tillotson Mfg. Co.
Uni—United Air Cleaner Div.
Var—Various
Wal—Walker Manufacturing Co.
Wau—Waukesha Motor Co.
Zen—Zenith Carburetor Div.

Ignition Systems and Batteries

Line Numbers	PASSENGER CAR MAKE AND MODEL	IGNITION: Make	Model	Max. Automatic Advance (Deg.) at What Engine R.P.M.	Inches Mercury Required for Vacuum Advance (±1 In.)	Max. Vacuum Advance (Deg.) at Inches of Mercury	POINT: Gap (In.)	POINT: Arm Tension (Oz.)	Cam Angle (Deg.)	TIMING: Spark Occurs Deg.—TDC	TIMING: Marks On	TIMING: Firing Order	COIL: Amperage Draw, Engine Stopped	COIL: Amperage Draw, Engine Idling	Ignition Lock Make	SPARK PLUGS: Make	SPARK PLUGS: Model	SPARK PLUGS: Thread Size	SPARK PLUGS: Gap (In.)	Ignition Cable Make	BATTERY: Make	BATTERY: Capacity—Amp. Hrs. at 20 hr. Rate	BATTERY: Plates per Cell	BATTERY: Bench Charging Rate, Start (Amp.)	BATTERY: Bench Charging Rate, Finish (Amp.)	Terminal Grounded	Location	Line Numbers
1	Bantam.....65	AL	IGW-4105C	20–.....	.....	.....	.022	17–20	46	4BT	No	1,3,4,2	4.5	2.50	Dg	CH	H-10	14	.025	Pak	AL	67	11	.....	.....	Neg	UH	1
2	Buick-Special.....41-40	DR	1110801	26–3000	6.0	12@13	.015	19–23	31	2BT	Fly	1,6,2,5,8,3,7,4	4.5	2.50	DR	AC	104	10	.025	Pak	DR	120	17	8.0	.....	Neg	UH	2
3	Buick-Super.....41-50	DR	1110801	26–3000	6.0	12@13	.015	19–23	31	4BT	Fly	1,6,2,5,8,3,7,4	4.5	2.50	D-B	AC	104	10	.025	Pak	DR	120	17	8.0	.....	Neg	UH	3
4	Buick-Century.....41-60	DR	1110801	26–3000	6.0	12@13	.015	19–23	31	6BT	Fly	1,6,2,5,8,3,7,4	4.5	2.50	D-B	AC	104	10	.025	Pak	DR	120	17	8.0	.....	Neg	UH	4
5	Buick-Roadmaster.....41-70	DR	1110801	26–3000	6.0	12@13	.015	19–23	31	6BT	Fly	1,6,2,5,8,3,7,4	4.5	2.50	D-B	AC	104	10	.025	Pak	DR	120	17	8.0	.....	Neg	UH	5
6	Buick-Limited.....41-90	DR	1110801	26–3000	6.0	12@13	.015	19–23	31	6BT	Fly	1,6,2,5,8,3,7,4	4.5	2.50	D-B	AC	104	10	.025	Pak	DR	120	17	8.0	.....	Neg	UH	6
7	Cadillac-V8.....61, 62, 63, 60S	DR	1110806	22–.....	.....	18@..	.015	24–28	31	5BT	TD	1,8,7,3,6,5,4,2	5.0	2.50	DR	AC	104	10	.028	Pak	DR	115	17	10.0	8.0	Pos	RF	7
8	Cadillac-V8.....67, 75	DR	1110806	22–.....	.....	18@..	.015	24–28	31	5BT	TD	1,8,7,3,6,5,4,2	5.0	2.50	DR	AC	104	10	.028	Pak	DR	115	17	10.0	8.0	Pos	RF	8
9	Chevrolet-Special DeL. & Master DeL...	DR	1110090	39–3450	.....	20@20	.021	17–21	38	5BT	Fly	1,5,3,6,2,4	5.0	2.50	DR	AC	104	10	.040	DR	DR	100	15	7.00	5.00	Neg	RF	9
10	Chrysler-Royal & Windsor.....C-28	AL	IGS-4113-1	24–3500	5.00	14@15	.020	17–20	38	TC	VD	1,5,3,6,2,4	5.0	2.25	YT	AL	A7	14	.025	.....	Wil	120	17	.....	.....	Pos	LF	10
11	Chrysler-New Yorker.....C30N, 30K	AL	IGT-4103-1	24–3500	5.00	16@17	.017	17–20	27	TC	VD	1,6,2,5,8,3,7,4	5.0	2.25	YT	AL	A7	14	.025	.....	Wil	135	19	.....	.....	Pos	LF	11
12	Chrysler-Crown Imperial.....C33	AL	IGT-4103A-1	24–3500	5.00	12@17	.017	17–20	27	3BT	VD	1,6,2,5,8,3,7,4	5.0	2.25	YT	AL	AL7	14	.025	.....	Wil	135	19	.....	.....	Pos	LF	12
13	Crosley.....CB-41	AL	IGW-4142	28–2600	.....	.....	.020	17–20	46	TC	Fly	1,2	5.0	2.00	Dg	AL	A5	14	.030	.....	AL	80	13	.....	.....	.....	RF	13
14	De Soto-DeLuxe & Custom.....S-8	AL	IGS-4113-1	24–3500	5.00	14@15	.020	17–20	38	.....	VD	1,5,3,6,2,4	5.0	2.25	YT	AL	A7	14	.025	.....	Wil	105	15	.....	.....	Pos	LF	14
15	Dodge-DeLuxe & Custom.....D-19	AL	IGS-4112-1	24–3500	5.00	16@16	.020	17–20	38	TC	VD	1,5,3,6,2,4	5.0	2.25	YT	AL	A7	14	.025	.....	AL	95	15	.....	.....	Pos	LF	15
16	Ford-DeLuxe & Super DeLuxe.....	Own	.....	20–3000	.....	.....	.015	20–24	.....	4BT	DH	1,5,4,8,6,3,7,2	.....	.....	.....	CH	H-10	14	.025	.....	Own	120	17	10	8	.....	UH	16
17	Hudson-DeLuxe & Traveler 6.....10	AL	IGW-4203A	23.5–3150	6.75	15@10	.020	17–20	35	TC	Fly	1,5,3,6,2,4	5.0	2.50	Mit	CH	J-9	14	.038	Ex	Nat	96	17	.....	.....	Pos	LF	17
18	Hudson-Super & Commodore 6....11-12	AL	IGW-4203A	23.5–3150	6.75	15@10	.020	17–20	35	TC	Fly	1,5,3,6,2,4	5.0	2.50	Mit	CH	J-9	14	.038	Ex	Nat	96	17	.....	.....	Pos	LF	18
19	Hudson-Commodore 8.....14	AL	IGP-4008A	35–3400	7.00	.....	.017	17–20	27	TC	Fly	1,6,2,5,8,3,7,4	5.0	2.50	Mit	CH	J-9	14	.038	Ex	Nat	108	19	.....	.....	Pos	LF	19
20	Hudson-Commodore Custom 8.....17	AL	IGP-4008A	35–3400	7.00	.....	.017	17–20	.....	TC	Fly	1,6,2,5,8,3,7,4	5.0	2.50	Mit	CH	J-9	14	.038	Ex	Nat	108	19	.....	.....	Pos	LF	20
21	Lincoln-Zephyr & Continental.....	Own	.....	20–3000	.....	.....	.015	20–24	.....	4BT	DH	1,4,9,8,5,2,11,10,3,6,7,12	.....	.....	.....	CH	H-10	14	.029	.....	.....	120	17	10	8	.....	UH	21
22	Lincoln-Custom.....	Own	.....	20–3000	.....	.....	.015	20–24	.....	4BT	DH	1,4,9,8,5,2,11,10,3,6,7,12	.....	.....	.....	CH	H-10	14	.029	.....	.....	120	17	10	8	.....	UH	22
23	Mercury.....	Own	.....	20–3000	.....	.....	.015	20–24	.....	4BT	DH	1,5,4,8,6,3,7,2	.....	.....	.....	CH	H-10	14	.025	.....	.....	120	17	10	8	.....	UH	23
24	Nash-Ambassador 600.....4140	DR	1110512	20–2400	.....	17@19	.021	17–21	35	TC	VD	1,5,3,6,2,4	.....	.....	DR	AL	AN7	14	.025	.....	AL	90	13	.....	.....	Pos	UF	24
25	Nash-Ambassador 6.....4160	AL	IGE-4024	23–1750	.....	.....	.020	17–20	35	.....	VD	1,5,3,6,2,4	5.0	.....	.....	AC	.....	14	.025	.....	AL	105	15	.....	.....	Pos	UF	25
26	Nash-Ambassador 8.....4180	AL	IGK-4102	24–2200	.....	.....	.017	17–20	28	9BT	VD	1,6,2,5,8,3,7,4	5.0	.....	.....	AC	.....	14	.025	.....	AL	120	17	.....	.....	Pos	UF	26
27	Oldsmobile-Special 6.....	DR	647-F	28–3800	5.00	20@18	.021	17–21	35	TC	Fly	1,5,3,6,2,4	4.5	2.00	DR	AC	44	14	.040	GM	DR	100	15	12.5	4.5	Neg	UH	27
28	Oldsmobile-Dynamic 6.....	DR	647-F	28–3800	5.00	20@18	.021	17–21	35	TC	Fly	1,5,3,6,2,4	4.5	2.00	DR	AC	44	14	.040	GM	DR	100	15	12.5	4.5	Neg	UH	28
29	Oldsmobile-Custom 6.....	DR	647-F	28–3800	5.00	20@18	.021	17–21	35	TC	Fly	1,5,3,6,2,4	4.5	2.00	DR	AC	44	14	.040	GM	DR	100	15	12.5	4.5	Neg	UH	29
30	Oldsmobile-Special 8.....	DR	1110802	30–4000	5.00	15@17	.015	19–23	31	2BT	Fly	1,6,2,5,8,3,7,4	4.5	2.00	DR	AC	44	14	.030	GM	DR	120	17	12.5	5.25	Neg	UH	30
31	Oldsmobile-Dynamic 8.....	DR	1110802	30–4000	5.00	15@17	.015	19–23	31	2BT	Fly	1,6,2,5,8,3,7,4	4.5	2.00	DR	AC	44	14	.030	GM	DR	120	17	12.5	5.25	Neg	UH	31
32	Oldsmobile-Custom 8.....	DR	1110802	30–4000	5.00	15@17	.015	19–23	31	2BT	Fly	1,6,2,5,8,3,7,4	4.5	2.00	DR	AC	44	14	.030	GM	DR	120	17	12.5	5.25	Neg	UH	32
33	Packard-One Ten.....1900	(b)	(b)	19–3200	6.00	15@17	.020	17–21	38	6BT	Fly	1,5,3,6,2,4	5.0	.....	BS	(a)	(a)	10	.028	.....	Wil	95	15	.....	.....	Pos	.....	33
34	Packard-One Twenty.....1901	AL	IGP-4502	23–3100	10.00	15@17	.017	17–20	27	7BT	Fly	1,6,2,5,8,3,7,4	5.0	.....	BS	(a)	(a)	10	.028	.....	AL	114	17	.....	.....	Pos	.....	34
35	Packard-Super Eight.....1903-4-5	AL	IGT-4102	23–3600	7.00	11@16	.017	17–20	27	5BT	VD	1,6,2,5,8,3,7,4	5.0	.....	BS	(a)	(a)	10	.028	.....	AL	114	17	.....	.....	Pos	.....	35
36	Packard-Custom Super Eight...1906-7-8	AL	IGT-4102	23–3600	7.00	11@16	.017	17–20	27	5BT	VD	1,6,2,5,8,3,7,4	5.0	.....	BS	(a)	(a)	10	.028	.....	AL	114	17	.....	.....	Pos	.....	36
37	Plymouth.....P-11	AL	IGS-4111-1	22–3700	5.00	20@17	.020	17–20	38	TC	FdP	1,5,3,6,2,4	5.0	2.25	YT	AL	A7	14	.025	.....	AL	90	13	.....	.....	Pos	LF	37
38	Plymouth-Special DeLuxe.....P-12	AL	IGS-4111-1	22–3700	5.00	20@17	.020	17–20	38	TC	FdP	1,5,3,6,2,4	5.0	2.25	YT	AL	A7	14	.025	.....	AL	90	13	.....	.....	Pos	LF	38
39	Pontiac-DeLuxe 6.....41-25	DR	647-D	28–4000	8.00	15@16	.021	17–21	35	4BT	Fly	1,5,3,6,2,4	.....	.....	DR	AC	45	14	.025	Pak	DR	100	15	7.0	.....	Neg	UH	39
40	Pontiac-Streamliner 6.....41-26	DR	647-D	28–4000	8.00	15@16	.021	17–21	35	4BT	Fly	1,5,3,6,2,4	.....	.....	DR	AC	45	14	.025	Pak	DR	100	15	7.0	.....	Neg	UH	40
41	Pontiac-Custom 6.....41-24	DR	647-D	28–4000	8.00	15@16	.021	17–21	35	4BT	Fly	1,5,3,6,2,4	.....	.....	DR	AC	45	14	.025	Pak	DR	100	15	7.0	.....	Neg	UH	41
42	Pontiac-DeLuxe 8.....41-27	DR	1110804	26–4000	8.00	20@17	.015	19–23	31	4BT	Fly	1,6,2,5,8,3,7,4	.....	.....	DR	AC	45	14	.025	Pak	DR	100	15	7.0	.....	Neg	UH	42
43	Pontiac-Streamliner 8.....41-28	DR	1110804	26–4000	8.00	20@17	.015	19–23	31	4BT	Fly	1,6,2,5,8,3,7,4	.....	.....	DR	AC	45	14	.025	Pak	DR	100	15	7.0	.....	Neg	UH	43
44	Pontiac-Custom 8.....41-29	DR	1110804	26–4000	8.00	20@17	.015	19–23	31	4BT	Fly	1,6,2,5,8,3,7,4	.....	.....	DR	AC	45	14	.025	Pak	DR	100	15	7.0	.....	Neg	UH	44
45	Studebaker-Champion.....3G	AL	IGW-4154	14–2800	4.00	18@15	.020	17–20	35	1BT	Fly	1,5,3,6,2,4	5.0	1.00	YT	CH	J8	14	.025	AW	Wil	90	13	5.75	5.75	Pos	UH	45
46	Studebaker-Commander 6.....11A	AL	IGW-4101	20–2800	3.00	12@12	.020	17–20	35	2BT	VD	1,5,3,6,2,4	5.0	1.00	YT	CH	8	18	.025	AW	Wil	95	15	5.75	5.75	Pos	LF	46
47	Studebaker-President 8.....7C	AL	IGH-4029	27–3600	3.00	12@12	.020	17–20	32	TC	VD	1,6,2,5,8,3,7,4	5.0	1.00	YT	CH	8	18	.025	AW	Wil	95	15	5.75	5.75	Pos	LF	47
48	Willys-Americar.....441	AL	IGW-4129	19–3000	3.50	20@15	.020	17–20	41	TC	Fly	1,3,4,2	5.0	2.50	YT	CH	J8	14	.030	Var	AL	80	13	7.00	5.00	Neg	RF	48

ABBREVIATIONS:
(a)—AC-104 or Champion Y4
(b)—AL-IGC-4505 or DR-1110092
AC—AC Spark Plug Company
AL—The Electric Auto-Lite Co.
AW—American Enamel Magnet Wire Co.
BS—Briggs & Stratton Corp.
BT—Before Top Center
CH—Champion Spark Plug Co.
D-B—Delco-Remy Div. and Briggs & Stratton Corp.
Dg—H. A. Douglas
DH—Plate on Distributor Housing
DR—Delco-Remy Division
Ex—Essex Wire Corp.
FdP—Fan Drive Pulley
Fly—Flywheel
GM—General Motors Corp.
LF—Under Hood at Left Side
Mit—Mitchellock-United Specialties Co.
Nat—National Battery Co.
Neg—Negative
Pak—Packard Electric Company
Pos—Positive
RF—Under Hood, Right Side
TC—Top Center **TD**—Timing Disc
UF—Under Front Seat
UH—Under Hood **Var**—Various
VD—Vibration Damper
Wil—Willard Storage Battery Co.
YT—Yale & Towne Mfg. Co.

Starting Motors, Lamps and Horns

Line Numbers	PASSENGER CAR MAKE AND MODEL	STARTING MOTOR: Make	Model	Cranking Speed	Brush Spring Tension (Oz.)	LOCK TEST: Amperage Draw	LOCK TEST: Volts	LOCK TEST: Torque (Lb. Ft.)	NO LOAD TEST: Amperage Draw	NO LOAD TEST: Volts	NO LOAD TEST: R.P.M.	Type of Drive	Starting Device	Starting Operation	FLYWHEEL: Pinion Meshes	FLYWHEEL: No. of Teeth	FLYWHEEL: Face Width of Teeth	FLYWHEEL: Ratio to Starter	LAMPS HEAD: Make	LAMPS HEAD: Location	LAMPS HEAD: Candlepower—Watts	LAMPS HEAD: Type of Bulb	LAMPS: Parking or Fender Light—Make	LAMPS: Tail and Stoplight—Make	HORN: Type	HORN: Number Used	HORN: Make	HORN: Amperage Draw of Each	Line Numbers
1	Bantam.....65	AL	MAK-4001	200	42–53	520	4.00	7.0	65	5.5	5000	Ben	.....	Pbd	F	80	5/8	8.00	C-B	IF	32–21	Sep	None	C-B	Vib	1	Sch	7	1
2	Buick-Special.....41-40	DR	1107005	.....	24–28	525	3.37	12.0	65	5.0	5000	OC	Sol	Dap	F	146	5/8	16.22	Guide	IF	45–35	SB	Guide	Guide	Vib	2	DR	19–21	2
3	Buick-Super.....41-50	DR	1107005	.....	24–28	525	3.37	12.0	65	5.0	5000	OC	Sol	Dap	F	146	5/8	16.22	Guide	IF	45–35	SB	Guide	Guide	Vib	2	DR	19–21	3
4	Buick-Century.....41-60	DR	1107908	.....	24–28	600	3.00	16.0	65	5.0	5500	OC	Sol	Dap	F	156	5/8	17.33	Guide	IF	45–35	SB	Guide	Guide	Vib	2	DR	19–21	4
5	Buick-Roadmaster.....41-70	DR	1107908	.....	24–28	600	3.00	16.0	65	5.0	5500	OC	Sol	Dap	F	156	5/8	17.33	Guide	IF	45–35	SB	Guide	Guide	Vib	2	DR	19–21	5
6	Buick-Limited.....41-90	DR	1107908	.....	24–28	600	3.00	16.0	65	5.0	5500	OC	Sol	Dap	F	156	5/8	17.33	Guide	IF	45–35	SB	Guide	Guide	Vib	2	DR	19–21	6
7	Cadillac-V8.....61, 62, 63, 60S	DR	1107923	.....	24–28	600	3.00	16.0	65	5.0	5500	OC	Sol	Pbd	F	156	1/2	17.00	Guide	IF	45–35	SB	Guide	Guide	AE	2	DR	19–21	7
8	Cadillac-V8.....67, 75	DR	1107923	.....	24–28	600	3.00	16.0	65	5.0	5500	OC	Sol	Pbd	F	156	1/2	17.00	Guide	IF	45–35	SB	Guide	Guide	AE	2	DR	19–21	8
9	Chevrolet-Spec. DeL. & Mas. DeL.	DR	1107033	65	.....	525	3.37	12.0	65	5.40	5000	OC	Man	Dsp	F	139	1/2	15.44	Guide	IF	45–35	SB	Guide	Guide	Vib	2	DR	20–20	9
10	Chrys.-Roy. & Windsor.....C-28	AL	Max-4045	.....	42–53	880	4.00	25.0	65	5.50	5300	OC	Sol	Pbd	F	146	1/2	16.22	C-B	IF	45–35	SB	C-B	.....	AE	2	AL	15	10
11	Chrysler-New Yorker. C30N, 30K	AL	Max-4045	.....	42–53	880	4.00	25.0	65	5.50	5300	OC	Sol	Pbd	F	146	11/16	16.22	C-B	IF	45–35	SB	C-B	.....	AE	2	AL	12	11
12	Chrysler-Crown Imperial.....C33	AL	Max-4045	.....	42–53	880	4.00	25.0	65	5.50	5300	OC	Sol	Pbd	F	146	1/2	16.22	C-B	IF	45–35	SB	C-B	.....	AE	2	AL	12	12
13	Crosley.....CB-41	AL	MZ-4077	240	42–53	560	4.00	11.8	70	5.50	4300	Ben	Man	Dsp	R	99	.385	9.90	C-B	RS	32–21	Sep	None	C-B	Vib	1	S-W	5	13
14	De Soto-DeLuxe & Custom.. S-8	AL	MAW-4019	.....	42–53	670	4.00	18.0	65	5.50	4900	OC	Man	Dsp	F	146	1/2	16.22	Hall	IF	45–35	SB	C-B	.....	AE	2	AL	15	14
15	Dodge-DeLuxe & Custom...D-19	AL	MZ-4089	.....	42–53	560	4.00	11.8	70	5.50	4300	OC	Man	Dsp	F	146	1/2	16.22	C-B	IF	45–35	SB	C-B	C-B	AE	2	AL	7	15
16	Ford-DeLuxe & Super DeLuxe..	Own	.....	100	.....	500	.....	14.0	.....	.....	.....	Ben	Sol	Pbd	.....	112	.....	11.20	Own	IF	45–35	SB	Own	Own	AE	2	.....	12–14	16
17	Hudson-DeLuxe & Traveler 6..10	AL	MZ-4092	.....	42–53	560	4.00	11.8	70	5.50	4300	Ben	Sol	Pbd	R	134	13/16	14.90	Hall	IF	45–35	SB	Hall	C-B	AE	2	(a)	15	17
18	Hudson-Super & Comm. 6..11-12	AL	MZ-4092	.....	42–53	560	4.00	11.8	70	5.50	4300	Ben	Sol	Pbd	R	134	13/16	14.90	Hall	IF	45–35	SB	Hall	C-B	AE	2	S-W	12	18
19	Hudson-Commodore 8.....14	AL	MAB-4100	.....	42–53	775	4.00	22.5	60	5.50	3700	Ben	Sol	Pbd	R	134	13/16	14.90	Hall	IF	45–35	SB	Hall	C-B	AE	2	S-W	15	19
20	Hudson-Comm. Custom 9.....17	AL	MAB-4100	.....	42–53	775	4.00	22.5	60	5.50	3700	Ben	Sol	Pbd	R	134	13/16	14.90	Hall	IF	45–35	SB	Hall	C-B	AE	2	S-W	15	20
21	Lincoln-Zephyr & Continental....	Own	.....	100	.....	500	.....	14.0	.....	.....	.....	Ben	Sol	Pbd	.....	112	.....	11.20	Own	IF	45–35	SB	Own	Own	AE	2	.....	12–14	21
22	Lincoln-Custom.....	Own	.....	100	.....	500	.....	14.0	.....	.....	.....	Ben	Sol	Pbd	.....	112	.....	11.20	Own	IF	45–35	SB	Own	Own	AE	2	.....	12–14	22
23	Mercury.....	Own	.....	100	.....	500	.....	14.0	.....	.....	.....	Ben	Sol	Pbd	.....	112	.....	11.20	Own	IF	45–35	SB	Own	Own	AE	2	.....	12–14	23
24	Nash-Ambassador 600.. 4140	DR	1109451	.....	24–26	540	3.30	11.5	60	5.70	6000	Ben	Man	Dcp	.....	122	.....	13.50	Hall	IF	45–35	SB	.....	C-B	Vib	.....	DR	7.5	24
25	Nash-Ambassador 6.....4160	AL	MAB-4076	160	42–53	775	4.00	22.5	60	5.50	3700	Ben	Man	Dcp	R	104	1/2	10.40	Hall	IF	45–35	SB	.....	C-B	.....	.....	DR	.....	25
26	Nash-Ambassador 8.....4180	AL	MAB-4104	160	42–53	775	4.00	22.5	60	5.50	3700	Ben	Man	Dcp	R	113	1/2	11.30	Hall	IF	45–35	SB	.....	C-B	Vib	.....	DR	.....	26
27	Oldsmobile-Special 6.....	DR	1107034	100	24–28	525	3.37	12.0	65	5.00	5000	OC	Man	Dsp	F	145	1/2	16.11	Guide	IF	45–35	SB	Guide	Guide	Vib	2	DR	18–20	27
28	Oldsmobile-Dynamic 6.....	DR	1107034	100	24–28	525	3.37	12.0	65	5.00	5000	OC	Man	Dsp	F	145	1/2	16.11	Guide	IF	45–35	SB	Guide	Guide	Vib	2	DR	18–20	28
29	Oldsmobile-Custom 6.....	DR	1107034	100	24–28	525	3.37	12.0	65	5.00	5000	OC	Man	Dsp	F	145	1/2	16.11	Guide	IF	45–35	SB	Guide	Guide	Vib	2	DR	18–20	29
30	Oldsmobile-Special 8.....	DR	1107922	100	24–28	600	3.00	15.0	60	5.00	6000	OC	Man	Dsp	F	145	1/2	16.11	Guide	IF	45–35	SB	Guide	Guide	Vib	2	DR	18–20	30
31	Oldsmobile-Dynamic 8.....	DR	1107922	100	24–28	600	3.00	15.0	60	5.00	6000	OC	Man	Dsp	F	145	1/2	16.11	Guide	IF	45–35	SB	Guide	Guide	Vib	2	DR	18–20	31
32	Oldsmobile-Custom 8.....	DR	1107922	100	24–28	600	3.00	15.0	60	5.00	6000	OC	Man	Dsp	F	145	1/2	16.11	Guide	IF	45–35	SB	Guide	Guide	Vib	2	DR	18–20	32
33	Packard-One Ten.....1900	AL	(b)		42–53	670	4.00	18.0	65	5.50	4900	Ben	Sol	Pbd	F	140	.....	15.55	Hall	IF	45–35	SB	Hall	Hall	AE	2	S-W	22–25	33
34	Packard-One Twenty.....1901	AL	MAW-4021	.....	42–53	670	4.00	18.0	65	5.50	4900	Ben	Sol	Pbd	F	140	.....	15.55	Hall	IF	45–35	SB	Hall	Hall	AE	2	S-W	22–25	34
35	Packard-Super Eight....1903-4-5	AL	MAX-4041	.....	42–53	906	4.00	45.9	77	5.50	2695	OC	Sol	Pbd	F	140	.....	15.55	Hall	IF	45–35	SB	Hall	Hall	AE	2	S-W	22–25	35
36	Packard-Cus. Sup. Eight.1906-7-8	AL	MAX-4041	.....	42–53	906	4.00	45.9	77	5.50	2695	OC	Sol	Pbd	F	140	.....	15.55	Hall	IF	45–35	SB	Hall	Hall	AE	2	S-W	22–25	36
37	Plymouth.....P-11	AL	MZ-4089	.....	42–53	560	4.00	11.8	70	5.50	4300	OC	Man	Dsp	F	146	1/2	16.22	C-B	IF	45–35	SB	C-B	C-B	Vib	1	AL	7	37
38	Plymouth-Special DeLuxe...P-12	AL	MZ-4089	.....	42–53	560	4.00	11.8	70	5.50	4300	OC	Man	Dsp	F	146	1/2	16.22	C-B	IF	45–35	SB	C-B	C-B	Vib	2	AL	7	38
39	Pontiac-DeLuxe 6.....41-25	DR	1107032	.....	24–28	525	3.37	12.0	65	5.00	5000	OC	Man	Dsp	F	140	1/2	15.56	Guide	IF	45–35	SB	Guide	Guide	Vib	2	DR	19–21	39
40	Pontiac-Streamliner 6.....41-26	DR	1107032	.....	24–28	525	3.37	12.0	65	5.00	5000	OC	Man	Dsp	F	140	1/2	15.56	Guide	IF	45–35	SB	Guide	Guide	Vib	2	DR	19–21	40
41	Pontiac-Custom 6.....41-24	DR	1107032	.....	24–28	525	3.37	12.0	65	5.00	5000	OC	Man	Dsp	F	140	1/2	15.56	Guide	IF	45–35	SB	Guide	Guide	Vib	2	DR	19–21	41
42	Pontiac-DeLuxe 8.....41-27	DR	1107921	.....	24–28	600	3.00	16.0	60	5.00	6000	OC	Man	Dsp	F	140	1/2	15.56	Guide	IF	45–35	SB	Guide	Guide	Vib	2	DR	19–21	42
43	Pontiac-Streamliner 8.....41-28	DR	1107921	.....	24–28	600	3.00	16.0	60	5.00	6000	OC	Man	Dsp	F	140	1/2	15.56	Guide	IF	45–35	SB	Guide	Guide	Vib	2	DR	19–21	43
44	Pontiac-Custom 8.....41-29	DR	1107921	.....	24–28	600	3.00	16.0	60	5.00	6000	OC	Man	Dsp	F	140	1/2	15.56	Guide	IF	45–35	SB	Guide	Guide	Vib	2	DR	19–21	44
45	Studebaker-Champion.....3G	AL	MZ-4090	130	42–53	560	4.00	11.8	70	5.50	4300	Ben	Man	Dcp	R	124	1/2	13.77	C-B	IF	45–35	SB	C-B	C-B	Vib	1	DR	6	45
46	Studebaker-Commander 6...11A	AL	MAW-4020	130	42–53	670	4.00	18.0	65	5.50	4900	Ben	Man	Dcp	F	133	1/2	14.78	C-B	IF	45–35	SB	C-B	C-B	Vib	2	DR	18	46
47	Studebaker-President 8.....7C	AL	MAX-4044	110	42–53	880	4.00	25.0	65	5.50	5300	OC	Sol	Pbd	F	133	1/2	14.78	C-B	IF	45–35	SB	C-B	C-B	Vib	2	DR	18	47
48	Willys-Americar.....441	AL	MZ-4093	.....	42–53	560	4.00	11.8	70	5.50	4300	Ben	Man	Pbd	F	97	5/8	9.70	C-B	IF	32–21	Sep	C-B	C-B	Vib	1	Sch	8	48

ABBREVIATIONS:

(a)—Sparks-Withington on De Luxe, Schwarze on Traveler
(b)—AL-MAW-4021 or DR-1107037
AE—Air Electric
AL—The Electric Auto-Lite Co.
Ben—Bendix,-Eclipse Machine Div.
C-B—Corcoran-Brown Lamp Division
Dap—Depress accelerator pedal
Dcp—Depress clutch pedal
Dsp—Depress starter pedal
DR—Delco-Remy Div.
F—Front
Guide—Guide Lamp Division
Hall—C. M. Hall Lamp Company
IF—In fender
Man—Manual
OC—Overrunning clutch
Pbd—Puch button on dash board
R—Rear
RS—Radiator shell
SB—Sealed beam
Sch—Schwarze Electric Co.
Sep—Separate bulb
Sol—Solenoid
S-W—Sparks-Withington Co.
Vib—Vibrator

Generators and Clutches

Line Numbers	PASSENGER CAR MAKE AND MODEL	Make	Model	Typ	Brush Springs Tension (Oz.)	Charging Control	MAXIMUM CONTROLLED CHARGING RATE				CUTOUT RELAY			VOLTAGE REGULATOR			CURRENT REGULATOR			Car Speed for Max. Charging Rate—M.P.H.	Ammeter—Make	CLUTCH								Line Numbers
							Temperature (F°)	Amperes	Voltage	R.P.M.	Voltage at Closing	Amperes to Open—Reverse Current	Average Air Gap (In.)	Volts	Temperature (F°)	Average Air Gap (In.)	Amperes	Temperature (F°)	Average Air Gap (In.)			Make	Semi-centrifugal	Vibration Insulator	Facings: Material	Facings: Inside Diam. (In.)	Facings: Outside Diam. (In.)	Facings: Thickness (In.)	Facings: No. Required	
1	Bantam 65	AL	GAS-4139A	3BR	53	No	.....	10	8.0	2600	6.4 7.0	.5 3	....	No	No	No	No	No	No	40	SW	Rock	.....	No	Mo	6½	8 7/16	.125	2	1
2	Buick-Special 41-40	DR	1102679	Shu	24-28	CV	Opr	34	8.0	2400	6.2-6.7	0-4	.020	7.2-7.4	Opr	.070	34	Opr	.077	24	AC	Own*	No	Spr	Wo	6½	10	.125	2	2
3	Buick-Super 41-50	DR	1102679	Shu	24-28	CV	Opr	34	8.0	2400	6.2-6.7	0-4	.020	7.2-7.4	Opr	.070	34	Opr	.077	24	AC	Own*	No	Spr	Wo	6½	10	.125	2	3
4	Buick-Century 41-60	DR	1102668	Shu	24-28	CV	Opr	34	8.0	2400	6.2-6.7	0-4	.020	7.2-7.4	Opr	.070	34	Opr	.077	26	AC	Own*	No	Spr	Wo	6½	10½	.125	2	4
5	Buick-Roadmaster 41-70	DR	1102668	Shu	24-28	CV	Opr	34	8.0	2400	6.2-6.7	0-4	.020	7.2-7.4	Opr	.070	34	Opr	.077	26	AC	Own*	No	Spr	Wo	6½	10½	.125	2	5
6	Buick-Limited 41-90	DR	1102668	Shu	24-28	CV	Opr	34	8.0	2400	6.2-6.7	0-4	.020	7.2-7.4	Opr	.070	34	Opr	.077	24	AC	Own*	No	Spr	Wo	6½	10½	.125	2	6
7	Cadillac-V8 61, 62, 63, 60S	DR	1102661	Shu	24-28	CV	Opr	34	8.0	2400	6.2-6.7	0-2	.....	7.2-7.4	.....	.....	34	.....	.....	.....	AC	Long	Yes	Spr	Wo	7	10½	.137	2	7
8	Cadillac-V8 67, 75	DR	1102661	Shu	24-28	CV	Opr	34	8.0	2400	6.2-6.7	0-2	.....	7.2-7.4	.....	.....	34	.....	.....	.....	AC	Long	Yes	Spr	Wo	7	11	.137	2	8
9	Chevrolet Spec. DeL. & Mas. DeL.	DR	1102667	Shu	24-28	CV	Opr	34	8.0	2400	6.2-6.7	0-3	.....	7.2-7.4	Opr	.072	34	Opr	.082	25.5	AC	Own‡	No	Spr	Wo	6⅛	9⅛	.135	2	9
10	Chrys.-Roy. & Windsor C-28	AL	GDZ-4801A	Shu	53	CV	H-C	35.0	8.0	2200	6.4-6.6	4.0-6.0	.032	7.2-7.5	70	.050	34-36	H-C	.050	24.0	.....	B&B	No	Spr†	Wo	6	9¼	.125	2	10
11	Chrysler-New Yorker C30N, 30K	AL	GDZ-4801A	Shu	53	CV	H-C	35.0	8.0	2200	6.4-6.6	4.0-6.0	.032	7.2-7.5	70	.050	34-36	H-C	.050	24.0	.....	B&B	No	FC	Wo	6	10	.125	2	11
12	Chrysler-Crown Imperial C33	AL	GDZ-4801A	Shu	53	CV	H-C	35.0	8.0	2200	6.4-6.6	4.0-6.0	.032	7.2-7.5	70	.050	34-36	H-C	.050	24.0	.....	B&B	No	FC	Wo	6	10	.125	2	12
13	Crosley CB-41	AL	GBM-4619-5	3BR	53	No	Hot	12.4	8.0	2400	6.5-7.2	0.5-2.5	.030	No	No	No	No	No	No	27.7	AC	Rock	.....	No	Mo	4	6	.125	2	13
14	De Soto-DeLuxe & Custom S-8	AL	GDZ-4801A	Shu	53	CV	H-C	35.0	8.0	2200	6.4-6.6	4.0-6.0	.032	7.2-7.5	70	.050	34-36	H-C	.050	24.0	.....	B&B	No	Spr†	Wo	7	10	.125	2	14
15	Dodge-DeLuxe & Custom D-19	AL	GDZ-4801A	Shu	53	CV	H-C	35.0	8.0	2200	6.4-6.6	4.0-6.0	.032	7.2-7.5	70	.050	34-36	H-C	.050	24.0	.....	B&B	No	Spr†	Wo	7	10	.125	2	15
16	Ford-DeLuxe & Super DeLuxe	Own	01A-1000	Shu	.....	CV	.....	32.0	.....	3000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Long	Yes	Spr	Mo	5.76	9	.137	2	16
17	Hudson-DeLuxe & Traveler 6 10	AL	GDS-4801A	3BR	53	Vol	70	33.0	8.0	3000	6.4-6.6	4.0-6.0	.032	7.3-7.6	70	.050	No	No	No	35.0	IL	Own	No	Spr	Co	5¼	8 11/16	11/64	90	17
18	Hudson-Super & Comm. 6 11-12	AL	GEC-4801A	3BR	53	Vol	70	41.0	8.0	3200	6.4-6.6	4.0-6.0	.032	7.3-7.6	70	.050	No	No	No	35.0	IL	Own	No	Spr	Co	5¼	8 11/16	11/64	90	18
19	Hudson-Commodore 8 14	AL	GEC-4801A	3BR	53	Vol	70	41.0	8.0	3200	6.4-6.6	4.0-6.0	.032	7.3-7.6	70	.050	No	No	No	35.0	IL	Own	No	Spr	Co	6⅜	9 13/16	11/64	108	19
20	Hudson-Comm. Custom 8 17	AL	GEC-4801A	3BR	53	Vol	70	41.0	8.0	3200	6.4-6.6	4.0-6.0	.032	7.3-7.6	70	.050	No	No	No	35.0	IL	Own	No	Spr	Co	6⅜	9 13/16	11/64	108	20
21	Lincoln-Zephyr & Continental	Own	01A-1000	Shu	.....	CV	.....	32.0	.....	3000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Long	Yes	Spr	Wo	6¾	10	.137	2	21
22	Lincoln-Custom	Own	01A-1000	Shu	.....	CV	.....	32.0	.....	3000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Long	Yes	Spr	Wo	6¾	10	.137	2	22
23	Mercury	Own	01A-1000	Shu	.....	CV	.....	32.0	.....	3000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Long	Yes	Spr	Wo	6¾	10	.125	2	23
24	Nash-Ambassador 600 4140	DR	1102684	Shu	24-28	CV	Opr	34	8.0	2400	6.2-6.7			7.2-7.4	Opr		34	Opr				B&B	No	Spr	Mm	5¼	7⅞	.125	2	24
25	Nash-Ambassador 6 4160	AL	GDZ-4806A	Shu	53	CV	H-C	35	8.0	.....	6.4-6.6	4.0-6.0	.032	7.2-7.5	70	.050	34-36	H-C	.050	.....	.....	B&B	No	Spr	Wo	7	10	.125	2	25
26	Nash-Ambassador 8 4180	AL	GDZ-4803B	Shu	53	CV	H-C	35	8.0	.....	6.4-6.6	4.0-6.0	.032	7.2-7.5	70	.050	34-36	H-C	.050	.....	.....	B&B	No	Spr	Wo	7	10	.125	2	26
27	Oldsmobile-Special 6	DR	1102664	Shu	24-28	CV	Opr	34	8.0	2400	6.2-6.7	2	.020	7.2-7.4	Opr	.080	34	Opr	.080	23.0	AC	B&B•	No	Spr	M-W	6	9¼	.125	2	27
28	Oldsmobile-Dynamic 6	DR	1102664	Shu	24-28	CV	Opr	34	8.0	2400	6.2-6.7	2	.020	7.2-7.4	Opr	.080	34	Opr	.080	23.0	AC	B&B•	No	Spr	Wo	6	9¼	.125	2	28
29	Oldsmobile-Custom 6	DR	1102664	Shu	24-28	CV	Opr	34	8.0	2400	6.2-6.7	2	.020	7.2-7.4	Opr	.080	34	Opr	.080	23.0	AC	B&B•	No	Spr	Wo	6	9¼	.125	2	29
30	Oldsmobile-Special 8	DR	1102664	Shu	24-28	CV	Opr	34	8.0	2400	6.2-6.7	2	.020	7.2-7.4	Opr	.080	34	Opr	.080	23.0	AC	B&B•	No	Spr	Wo	7	10	.125	2	30
31	Oldsmobile-Dynamic 8	DR	1102664	Shu	24-28	CV	Opr	34	8.0	2400	6.2-6.7	2	.020	7.2-7.4	Opr	.080	34	Opr	.080	23.0	AC	B&B•	No	Spr	Wo	7	10	.125	2	31
32	Oldsmobile-Custom 8	DR	1102664	Shu	24-28	CV	Opr	34	8.0	2400	6.2-6.7	2	.020	7.2-7.4	Opr	.080	34	Opr	.080	23.0	AC	B&B•	No	Spr	Wo	7	10	.125	2	32
33	Packard-One Ten 1900	AL(a)	GDZ-4801F(a)	Shu	53	CV	H-C	35	8.0	.....	6.4-6.6	4.0-6.0	.032	7.2-7.5	70	.050	34-36	H-C	.050	.....	.....	Long	Yes	Spr	Wo	6	9½	.125	2	33
34	Packard-One Twenty 1901	AL	GDZ-4801F	Shu	53	CV	H-C	35	8.0	.....	6.4-6.6	4.0-6.0	.032	7.2-7.5	70	.050	34-36	H-C	.050	.....	.....	Long	Yes	Spr	Wo	6	10	.125	2	34
35	Packard-Super Eight 1903-4-5	AL	GEA-4802A	Shu	53	CV	H-C	35	8.0	.....	6.4-6.6	4.0-6.0	.032	7.2-7.5	70	.050	34-36	H-C	.050	.....	.....	Long	Yes	Spr	Wo	6½	11	.125	2	35
36	Packard-Cus. Sup. Eight 1906-7-8	AL	GEA-4802A	Shu	53	CV	H-C	35	8.0	.....	6.4-6.6	4.0-6.0	.032	7.2-7.5	70	.050	34-36	H-C	.050	.....	.....	Long	Yes	Spr	Wo	6½	11	.125	2	36
37	Plymouth P-11	AL	GDZ-4801A	Shu	53	CV	H-C	35	8.0	.....	6.4-6.6	4.0-6.0	.032	7.2-7.5	70	.050	34-36	H-C	.050	.....	.....	B&B	No	Spr	Wo	6	9¼	.125	2	37
38	Plymouth-Special DeLuxe P-12	AL	GDZ-4801A	Shu	53	CV	H-C	35	8.0	.....	6.4-6.6	4.0 6.0	.032	7.2-7.5	70	.050	34-36	H-C	.050	.....	.....	B&B	No	Spr	Wo	6	9¼	.125	2	38
39	Pontiac-DeLuxe 6 41-25	DR	1102665	Shu	24-28	CV	Opr	34	8.0	2400	6.2-6.7	0-4	.020	7.2 7.4	Opr	.072	34	Opr	.082	35.0	AC	Inl**	No	Spr	Mo	6	9⅛	.125	2	39
40	Pontiac-Streamliner 6 41-26	DR	1102665	Shu	24-28	CV	Opr	34	8.0	2400	6.2-6.7	0-4	.020	7.2-7.4	Opr	.072	34	Opr	.082	35.0	AC	Inl	No	Spr	Mo	6	9⅛	.125	2	40
41	Pontiac-Custom 6 41-24	DR	1102665	Shu	24-28	CV	Opr	34	8.0	2400	6.2-6.7	0-4	.020	7.2-7.4	Opr	.072	34	Opr	.082	35.0	AC	Inl	No	Spr	Mo	6	9⅛	.125	2	41
42	Pontiac-DeLuxe 8 41-27	DR	1102665	Shu	24-28	CV	Opr	34	8.0	2400	6.2-6.7	0-4	.020	7.2-7.4	Opr	.072	34	Opr	.082	35.0	AC	Inl	No	Spr	Mo	6	9½	.125	2	42
43	Pontiac-Streamliner 8 41-28	DR	1102665	Shu	24-28	CV	Opr	34	8.0	2400	6.2-6.7	0-4	.020	7.2-7.4	Opr	.072	34	Opr	.082	35.0	AC	Inl	No	Spr	Mo	6	9½	.125	2	43
44	Pontiac-Custom 8 41-29	DR	1102665	Shu	24-28	CV	Opr	34	8.0	2400	6.2-6.7	0-4	.020	7.2-7.4	Opr	.072	34	Opr	.082	35.0	AC	Inl	No	Spr	Mo	6	9½	.125	2	44
45	Studebaker-Champion 3G	AL	GDZ-4804A	Shu	53	CV	H-C	35	8.0	1600	6.4-6.6	4.0-6.0	.032	7.2-7.5	70	.050	34-36	H-C	.050	18.3	M-M	B&B	No	Spr	Mm	5⅝	8	.125	2	45
46	Studebaker-Commander 6 11A	AL	GDZ-4805A	Shu	53	CV	H-C	35	8.0	1800	6.4-6.6	4.0-6.0	.032	7.2-7.5	70	.050	34-36	H-C	.050	20.0	M-M	B&B	No	Spr	Mm	6	9¼	.125	2	46
47	Studebaker-President 8 7C	AL	GDZ-4805A	Shu	53	CV	H-C	35	8.0	1800	6.4-6.6	4.0-6.0	.032	7.2-7.5	70	.050	34-36	H-C	.050	20.0	M-M	Inl**	No	Spr	M-W	6	9½	.125	2	47
48	Willys-Americar 441	AL	GCJ-4811A	3BR	53	Vol	70	25	8.0	.....	6.4-6.6	4.0-6.0	.032	7.2-7.5	70	.050	No	No	No	.....	K-S	Atw‡	No	Spr	Mo	5⅛	7⅞	.125	2	48

ABBREVIATIONS:

*—Long or Borg & Beck Discs
**—With Long Discs
†—Fluid Coupling at Extra Cost
‡—Borg & Beck Disc
•—With Hydra-Matic Drive furnished at extra cost there is no clutch
3BR—Third Brush Type
(a)—Or Delco-Remy 1102682
AC—AC Spark Plug Co.
AL—The Electric Auto-Lite Co.
Atw—Atwood
B&B—Borg & Beck Division
Co—Cork
CV—Current and Voltage Regulator
DR—Delco-Remy Division
FC—Fluid Coupling
H-C—Hot or Cold
IL—Indicating Light
Inl—Inland Manufacturing Division
K-S—King-Seeley Corp.
Long—Long Mfg. Div.
Mm—Molded Metallic
M-M—Moto-Meter Gauge and Equipment Division
M-W—Molded and Woven
Mo—Molded
No—No or None
Opr—Operating
Rock—Rockford Drilling Mach. Div.
Shu—Shunt
Spr—Springs
SW—Stewart-Warner Corp.
Vol—Voltage Regulator
Wo—Woven

Transmissions and Universal Joints

Line Numbers	PASSENGER CAR MAKE AND MODEL	Make	No. of Forward Speeds	SHIFTING: Lever Location	SHIFTING: Meshing of Gears	SHIFTING: Selection of Gears	OVERDRIVE: Make	OVERDRIVE: Lubrication: Capacity (Pts.)	OVERDRIVE: Lubrication: Grade: Summer	OVERDRIVE: Lubrication: Grade: Winter	GEAR RATIOS: Rear Axle	GEAR RATIOS: Transmission: Overdrive	GEAR RATIOS: Transmission: Low	GEAR RATIOS: Transmission: Second	GEAR RATIOS: Transmission: Reverse	Constant Mesh Gears on Second	TYPE GEARS: Second Speed	TYPE GEARS: First Speed	TYPE GEARS: Reverse	Synchronous Meshing Second and Third Gears	LUBRICATION: Capacity (Pts.)	LUBRICATION: Grade: Summer	LUBRICATION: Grade: Winter	UNIVERSAL JOINTS: Make	UNIVERSAL JOINTS: Number Used	UNIVERSAL JOINTS: Type	UNIVERSAL JOINTS: Lubricated With	Drive Medium	Torque Medium	Line Numbers
1	Bantam 65	WG	3	Fl			No	No	No	No	5.25	No	2.93	1.71	3.90	Y	Hl	Sp	Sp	Y	1¼	160	90	UP	2	Met	No	Sp	SP	1
2	Buick-Special 41-40	Own	3	SC	RL	RL	No	No	No	No	4.40	No	2.67	1.66	3.02	Y	Hl	Hl	Hl	Y	1¾	90EP	80EP	S-S	1	Mp	FT	TT	TT	2
3	Buick-Super 41-50	Own	3	SC	RL	RL	No	No	No	No	4.10	No	2.67	1.66	3.02	Y	Hl	Hl	Hl	Y	1¾	90EP	80EP	S-S	1	Mp	FT	TT	TT	3
4	Buick-Century 41-60	Own	3	SC	RL	RL	No	No	No	No	3.90	No	2.39	1.53	2.53	Y	Hl	Hl	Hl	Y	2½	90EP	80EP	Sag	1	Mp	FT	TT	TT	4
5	Buick-Roadmaster 41-70	Own	3	SC	RL	RL	No	No	No	No	3.90	No	2.39	1.53	2.53	Y	Hl	Hl	Hl	Y	2½	90EP	80EP	Sag	1	Mp	FT	TT	TT	5
6	Buick-Limited 41-90	Own	3	SC	RL	RL	No	No	No	No	4.18	No	2.39	1.53	2.53	Y	Hl	Hl	Hl	Y	2½	90EP	80EP	Sag	1	Mp	FT	TT	TT	6
7	Cadillac-V8 61, 62, 63, 60S	Own	3	SC	RL	RL	No	No	No	No	3.77	No	2.39	1.53	2.39	Y	Hl	Hl	Hl	Y	2½	90EP	90EP	Mec	2	Nb	PL	SP	SP	7
8	Cadillac-V8 67, 75	Own	3	SC	RL	RL	No	No	No	No	4.27	No	2.39	1.53	2.39	Y	Hl	Hl	Hl	Y	2½	90EP	90EP	Mec	2	Nb	PL	SP	SP	8
9	Chevrolet-Special DeL. & Master DeL.	Own	3	SC	RL	RL	No	No	No	No	4.11	No	2.94	1.68	2.94	Y	Hl	Hl	Hl	Y	1½	90	90	Own	1	Ma	FT	SP	TT	9
10	Chrysler-Royal & Windsor C-28	Own	3	SC	RL	RL	**	No	No	No	3.90	No	2.57	1.83	3.48	Y	Hl	Hl	Sp	Y	2¾	.....	.....	.....	2	CT	FG	SP	SP	10
11	Chrysler-New Yorker C30N, 30K	Own	3	SC	RL	RL	(a)	1¼(a)	.....	.....	(b)	.722(a)	2.57	1.83	3.48	Y	Hl	Hl	Hl	Y	2¾	90EP	90EP	.....	2	CT	FG	SP	SP	11
12	Chrysler-Crown Imperial C33	Own	‡	SC	RL	RL	WG	1¼	.....	.....	4.55	.722	2.57	1.83	3.48	Y	Hl	Hl	Hl	Y	2¾	90EP	90EP	.....	3	CT	FG	SP	SP	12
13	Crosley CB-41	WG	3	Fl			No	No	No	No	5.14	No	3.29	1.72	3.29	Y	Sp	Sp	Sp	N	1	90	90	Spi	1	Mp	Gr	TT	TT	13
14	De Soto-DeLuxe & Custom S-8	Own	3	SC	RL	RL	**	.....	.....	.....	4.10	**	2.57	1.83	3.48	Y	Hl	Hl	Hl	Y	2¾	90EP	90EP	.....	2	CT	FG	SP	SP	14
15	Dodge-DeLuxe & Custom D-19	Own	3	SC	RL	RL	No	No	No	No	4.30	No	2.57	1.83	3.48	Y	Hl	Hl	Hl	Y	2¾	90EP	90EP	.....	2	BT	FG	SP	SP	15
16	Ford-DeLuxe & Super DeLuxe	Own	3	SC	RL	RL	No	No	No	No	3.78	No	3.11	1.77	4.00	Y	Hl	Hl	Hl	Y	2¾	160	110	Spi	1	Sb	Ssb	TT	RR	16
17	Hudson-DeLuxe & Traveler 6 10	Own	3	SC	RL	Cab	WG††	1¼	90EP	90EP	4.55	.72††	2.88	1.82	3.50	Y	Hl	Hl	Hl	Y	2	90EP	80EP	Spi	2	Nb	Ssb	SP	SP	17
18	Hudson-Super & Commodore 6 11-12	Own	3	SC	RL	Cab	WG††	1¼	90EP	90EP	4.11	.72††	2.61	1.65	3.17	Y	Hl	Hl	Hl	Y	2	90EP	80EP	Spi	2	Nb	Ssb	SP	SP	18
19	Hudson-Commodore 8 14	Own	3	SC	RL	Cab	WG††	1¼	90EP	90EP	4.11	.72††	2.61	1.65	3.17	Y	Hl	Hl	Hl	Y	2	90EP	80EP	Spi	2	Nb	Ssb	SP	SP	19
20	Hudson-Commodore Custom 8 17	Own	3	SC	RL	Cab	WG††	1¼	90EP	90EP	4.11	.72††	2.61	1.65	3.17	Y	Hl	Hl	Hl	Y	2	90EP	80EP	Spi	2	Nb	Ssb	SP	SP	20
21	Lincoln-Zephyr & Continental	Own	3	SC	RL	RL	††	.....	.....	.....	4.44	††	2.33	1.57	3.00	Y	Hl	Hl	Hl	Y	2¾	.....	.....	Spi	1	Nb	Ssb	TT	TT	21
22	Lincoln-Custom	Own	3	SC	RL	RL	††	.....	.....	.....	4.44	††	2.33	1.57	3.00	Y	Hl	Hl	Hl	Y	2¾	.....	.....	Spi	1	Nb	Ssb	TT	TT	22
23	Mercury	Own	3	SC	RL	RL	No	No	No	No	3.54	No	3.11	1.77	4.00	Y	Hl	Hl	Hl	Y	2¾	.....	.....	Spi	1	Sb	Ssb	TT	TT	23
24	Nash-Ambassador 600 4140	WG	3	SC	RL	RL	WG††	2	70	50	4.10	.72††	2.66	1.56	3.55	Y	Hl	Hl	Hl	Y	1	70	50	Mec	1	Met	PL	TT	TT	24
25	Nash-Ambassador 6 4160	.....	3	SC	RL	RL	WG††	2	70	50	4.10	.72††	2.57	1.55	3.48	Y	Hl	Hl	Hl	Y	4	70	50	Mec	2	Met	PL	SP	SP	25
26	Nash-Ambassador 8 4180	Own	3	SC	RL	RL	WG††	2	70	50	4.10	.72††	2.57	1.55	3.48	Y	Hl	Hl	Hl	Y	4	70	50	Mec	2	Met	PL	SP	SP	26
27	Oldsmobile-Special 6	Own	3	SC	RL	RL	●	.....	.....	.....	4.10	.....	2.66	1.66	3.02	Y	Hl	Hl	Hl	Y	2	90	90	Mec	2	Met	PL	SA	SA	27
28	Oldsmobile-Dynamic 6	Own	3	SC	RL	RL	●	.....	.....	.....	4.30	.....	2.66	1.66	3.02	Y	Hl	Hl	Hl	Y	2	90	90	Mec	2	Met	PL	SA	SA	28
29	Oldsmobile-Custom 6	Own	3	SC	RL	RL	●	.....	.....	.....	4.30	.....	2.66	1.66	3.02	Y	Hl	Hl	Hl	Y	2	90	90	Mec	2	Met	PL	SA	SA	29
30	Oldsmobile-Special 8	Own	3	SC	RL	RL	●	.....	.....	.....	4.10	.....	2.66	1.66	3.02	Y	Hl	Hl	Hl	Y	2	90	90	Mec	2	Met	PL	SA	SA	30
31	Oldsmobile-Dynamic 8	Own	3	SC	RL	RL	●	.....	.....	.....	4.30	.....	2.66	1.66	3.02	Y	Hl	Hl	Hl	Y	2	90	90	Mec	2	Met	PL	SA	SA	31
32	Oldsmobile-Custom 8	Own	3	SC	RL	RL	●	.....	.....	.....	4.30	.....	2.66	1.66	3.02	Y	Hl	Hl	Hl	Y	2	90	90	Mec	2	Met	PL	SA	SA	32
33	Packard-One Ten 1900	Own	3	SC			WG††	1¼	140	90	4.30	.72††	2.43	1.53	3.16	Y	Hl	Hl	Hl	Y	2	140	90	UP	2	Met	GG	SP	SP	33
34	Packard-One Twenty 1901	Own	3	SC	.....	.....	WG††	1¼	140	90	4.09	.72††	2.43	1.53	3.16	Y	Hl	Hl	Hl	Y	2	140	90	Mec	2	Met	GG	SP	SP	34
35	Packard-Super Eight 1903-4-5	Own	3	SC	.....	.....	WG††	1¼	140	90	(c)	.72††	2.43	1.53	3.16	Y	Hl	Hl	Hl	Y	2	140	90	Mec	2	Met	GG	SP	SP	35
36	Packard-Custom Super Eight 1906-7-8	Own	3	SC	.....	.....	WG††	1¼	140	90	(c)	.72††	2.43	1.53	3.16	Y	Hl	Hl	Hl	Y	2	140	90	Mec	2	Met	GG	SP	SP	36
37	Plymouth P-11	.....	3	SC	RL	RL	No	No	No	No	4.1	No	2.57	1.83	3.48	Y	Hl	Hl	Hl	Y	2¾	90EP	90EP	.....	2	BT	FG	SP	SP	37
38	Plymouth-Special DeLuxe P-12	.....	3	SC	RL	RL	No	No	No	No	4.3	No	2.57	1.83	3.48	Y	Hl	Hl	Hl	Y	2¾	90EP	90EP	.....	2	BT	FG	SP	SP	38
39	Pontiac-DeLuxe 6 41-25	Own	3	SC	RL	RL	No	No	No	No	4.10	No	2.67	1.66	3.02	Y	Hl	Hl	Hl	Y	1¾	140	90	S-M	2	Met	PL	SP	SP	39
40	Pontiac-Streamliner 6 41-26	Own	3	SC	RL	RL	No	No	No	No	4.30	No	2.67	1.66	3.02	Y	Hl	Hl	Hl	Y	1¾	140	90	S-M	2	Met	PL	SP	SP	40
41	Pontiac-Custom 6 41-24	Own	3	SC	RL	RL	No	No	No	No	4.30	No	2.67	1.66	3.02	Y	Hl	Hl	Hl	Y	1¾	140	90	S-M	2	Met	PL	SP	SP	41
42	Pontiac-DeLuxe 8 41-27	Own	3	SC	RL	RL	No	No	No	No	4.10	No	2.67	1.66	3.02	Y	Hl	Hl	Hl	Y	1¾	140	90	S-M	2	Met	PL	SP	SP	42
43	Pontiac-Streamliner 8 41-28	Own	3	SC	RL	RL	No	No	No	No	4.30	No	2.67	1.66	3.02	Y	Hl	Hl	Hl	Y	1¾	140	90	S-M	2	Met	PL	SP	SP	43
44	Pontiac-Custom 8 41-29	Own	3	SC	RL	RL	No	No	No	No	4.30	No	2.67	1.66	3.02	Y	Hl	Hl	Hl	Y	1¾	140	90	S-M	2	Met	PL	SP	SP	44
45	Studebaker-Champion 3G	WG	3	SC	RL	RL	WG††	(d)	90M	90M	4.56	.72††	2.67	1.56	3.55	Y	Hl	Hl	Hl	Y•	(e)	90M	90M	Spi	2	Met	PL	SP	SP	45
46	Studebaker-Commander 6 11A	WG	3	SC	RL	RL	WG	2	90M	90M	4.55	.722	2.57	1.55	3.48	Y	Hl	Hl	Hl	Y	2½	90	90	Spi	2	Met	CL	SP	SP	46
47	Studebaker-President 8 7C	WG	3	SC	RL	RL	WG	2	90M	90M	4.55	.722	2.57	1.55	3.48	Y	Hl	Hl	Hl	Y	2½	90	90	Spi	2	Met	CL	SP	SP	47
48	Willys-Americar 441	WG	3	SC	RL	RL	No	No	No	No	4.44	No	2.66	1.56	3.55	Y	Hl	Hl	Hl	Y	1	90	90	UP	2	Met	GG	SP	SP	48

ABBREVIATIONS:

●—Hydra-Matic Drive available at extra cost
**—Underdrive or semi-automatic transmission at extra cost
‡—Three plus two in overdrive
††—Overdrive at extra cost

(a)—Overdrive standard on C-30N, extra cost on C-30K
(b)—With overdrive 4.56; without overdrive 3.91
(c)—3.92 on 1803-6; 4.09 on 1804-7; 4.36 on 1805-8
(d)—27 ounces
(e)—18 ounces
90M—SAE 90 Mineral Base Oil

BT—Ball and trunnion with roller bearings
Cab—Cable
CL—Chassis Lubricant
CT—Cross type with roller bearings
EP—Extreme Pressure
Fl—From Floor
FG—Short Fibre Grease
FT—From Transmission
GG—Repack with gun grease
Gr—Grease
Hl—Helical
Ma—Metal with anti-friction bearings
Mec—Mechanics Universal Joint
Met—Metal with anti-friction bearings
Mp—Metal with plain bearings
Nb—Needle bearing
N, No—No or None
PL—Permanent Lubrication
RL—Rod Linkage
RR—Radius Rods
SA—Stabilizing Arms
Sag—Saginaw Steering Gear Div.
Sb—Steel Bushing
SC—Steering Column
S-M—Saginaw Steering Gear Div. and Mechanics Universal Joint Div.
SP—Springs
Spi—Spicer Manufacturing Co.
S-S—Saginaw Steering Gear Div. or Spicer Mfg. Corp.
Ssb—Soda Soap Grease
TT—Torque Tube
UP—Universal Products Co.
WG—Warner Gear Div.
Y—Yes

Rear Axle, Tires, Wheels

Line Numbers	PASSENGER CAR MAKE AND MODEL	REAR AXLE: Make	Type	Min. Road Clearance	LUBRICATION: Capacity (Pts.)	GRADE: Summer	GRADE: Winter	GEARING: Type	Ratios: Standard	Ratios: Optional	No. of Teeth: Ring	No. of Teeth: Pinion	Pinion Adjustment	Pinion Bearing Adjustment	Pinion Bearing in Sleeve	Back Lash (Average)	Pinion Bearing—Preloaded	Differential Bearings—Preloaded	TIRES: Make	Size	Number of Plies	Inflation Pressure (Lbs.) Cold: Front	Inflation Pressure (Lbs.) Cold: Rear	RIM: Diameter (In.)	RIM: Width (In.)	WHEELS: Type	WHEELS: Make	Line Numbers
1	Bantam.....65	Spi	½F	7½	1¼	160	90	5B	5.25	No	42	8	Shim	Shim	No	.007			Firestone	4.00/15	4	24	24	15	3.00	Disc	MW	1
2	Buick-Special.....41-40	Own	½F	7	3	90Hyp	90Hyp	Hyp	4.40	3.90	44	10	Shim	No	No	.008	Yes	Yes	U.S., Fir, Gy, Go	6.50/16	4	25	30	16	5.00	Disc	MW	2
3	Buick-Super.....41-50	Own	½F	7	3	90Hyp	90Hyp	Hyp	4.10	3.90	49	12	Shim	No	No	.008	Yes	Yes	U.S., Fir, Gy, Go	6.50/16	4	25	30	16	5.00	Disc	MW	3
4	Buick-Century.....41-60	Own	½F	7	3	90Hyp	90Hyp	Hyp	3.90	3.60	39	10	Shim	No	No	.008	Yes	Yes	U.S., Fir, Gy, Go	7.00/15	4	25	30	15	5.00	Disc	MW	4
5	Buick-Roadmaster.....41-70	Own	½F	7	3	90Hyp	90Hyp	Hyp	3.90	3.60	39	10	Shim	No	No	.008	Yes	Yes	U.S., Fir, Gy, Go	7.00/15	4	25	30	15	5.00	Disc	MW	5
6	Buick-Limited.....41-90	Own	½F	7	3	90Hyp	90Hyp	Hyp	4.20	No	46	11	Shim	No	No	.008	Yes	Yes	U.S., Fir, Gy, Go	7.50/16	6	25	30	16	5.00	Disc	MW	6
7	Cadillac-V8.....61, 62, 63, 60S	Own	½F	8	5	90Hyp	90Hyp	Hyp	3.77	3.36	49	13	No	No	No	.007	Yes	Yes	U.S., Fir	7.00/15	4	28	28	15	5.50	Disc	KH	7
8	Cadillac-V8.....67, 75	Own	½F	9	5	90Hyp	90Hyp	Hyp	4.27	.....	47	11	No	No	No	.007	Yes	Yes	U.S., Fir	7.50/16	6	24	32	16	5.00	Disc	KH	8
9	Chevrolet-Spec. DeL. & Mas. DeL.	Own	½F	.....	3½	90Hyp	90Hyp	Hyp	4.11	3.73	37	9	Shim	No	No	.006	Yes	No	Various	6.00/16	4	26	28	16	4.00	Disc	Own	9
10	Chrys.-Roy. & Windsor.....C-28	Own	½F	8¾	3¼	90Hyp	90Hyp	Hyp	3.90	.....	39	10	Shim	Shim	No	.006	Yes	Yes	Goodyear	6.25/16	4	28	28	16	4.25	Disc	.....	10
11	Chrysler-New Yorker..C30N, 30K	Own	½F	8¾	3¼	90Hyp	90Hyp	Hyp	3.91	.....	(d)	(d)	Shim	Shim	No	.008	Yes	Yes	Goodyear	7.00/15	4	28	28	15	5.00	Disc	.....	11
12	Chrysler-Crown Imperial.....C33	Own	½F	8½	5	90Hyp	90Hyp	Hyp	4.55	.....	41	9	No	Shim	.....	.008	Yes	Yes	Goodyear	7.50/15	4	28	28	15	5.00	Disc	.....	12
13	Crosley.....CB-41	Spi	½F	6¼	1½	90	90	SB	5.14	5.57	36	7	Shim	Shim	No	.006	.....	.....	Goodrich	4.25/12	4	25	25	12	2.50	Disc	MW	13
14	De Soto-DeLuxe & Custom...S-8	Own	½F	8⅝	3¼	90Hyp	90Hyp	Hyp	4.10	.....	41	10	Shim	Shim	No	.008	Yes	Yes	Goodyear	6.25/16	4	28	28	16	4.25	Disc	.....	14
15	Dodge-DeLuxe & Custom...D-19	Own	½F	8⅝	3¼	90Hyp	90Hyp	Hyp	4.30	.....	43	10	Shim	Shim	No	.008	Yes	Yes	Goodyear	6.00/16	4	28	28	16	4.00	Disc	.....	15
16	Ford-DeLuxe & Super DeLuxe...	Own	¾F	8.4	2½	90EP	90EP	SB	3.78	.....	34	9	.....	.....	.....	.012	Yes	.....	.....	6.00/16	4	30	30	16	4.00	Disc	.....	16
17	Hudson-DeLuxe & Traveler 6..10	Own	½F	8⅜	2¾	90EP	90EP	SB	4.55	4.11	41	9	Shim	Shim	No	.002	Yes	Yes	Goodyear	(e)	4	(f)	(f)	16	(g)	Disc	MW	17
18	Hudson-Super & Comm. 6..11-12	Own	½F	(h)	2¾	90EP	90EP	SB	4.11	4.55	37	9	Shim	Shim	No	.002	Yes	Yes	Goodyear	(i)	4	26	30	16	4.50	Disc	MW	18
19	Hudson-Commodore 8.....14	Own	½F	8½	2¾	90EP	90EP	SB	4.11	4.55	37	9	Shim	Shim	No	.002	Yes	Yes	Goodyear	6.25/16	4	26	30	16	4.50	Disc	MW	19
20	Hudson-Comm. Custom 8.....17	Own	½F	8⅝	2¾	90EP	90EP	SB	4.11	4.55	37	9	Shim	Shim	No	.002	Yes	Yes	Goodyear	6.50/16	4	26	30	16	5.00	Disc	MW	20
21	Lincoln-Zephyr & Continental....	Own	¾F	9	4	90Hyp	90Hyp	Hyp	4.44	.....	40	9	.....	.....	.....	.003	Yes	.....	.....	7.00/16	4	28	28	16	5.00	Disc	.....	21
22	Lincoln-Custom.....	Own	¾F	9	4	90Hyp	90Hyp	Hyp	4.44	.....	40	9	.....	.....	.....	.003	Yes	.....	.....	7.00/16	4	28	28	16	5.00	Disc	.....	22
23	Mercury.....	Own	¾F	8.4	2½	90EP	90EP	SB	3.54	.....	39	11	.....	.....	.....	.010	Yes	.....	.....	6.50/16	4	30	30	16	5.00	Disc	.....	23
24	Nash-Ambassador 600..4140	Own	½F	8½	3	90Hyp	90Hyp	Hyp	4.11	4.37	37	9	Shim	Shim	No	.007	Yes	Yes	.....	5.50/16	4	28	28	16	4.00	.....	Budd	24
25	Nash-Ambassador 6.....4160	Own	½F	8½	4	90Hyp	90Hyp	Hyp	4.10	4.44	41	10	Shim	Shim	No	.....	No	No	.....	6.25/16	4	28	28	16	4.50	Disc	.....	25
26	Nash-Ambassador 8.....4180	Own	½F	8½	4	90Hyp	90Hyp	Hyp	4.10	4.44	41	10	Shim	Shim	No	.....	.....	.....	.....	6.50/16	4	26	26	16	5.00	Disc	MW	26
27	Oldsmobile-Special 6.....	Own	½F	7⅛	2½	90Hyp	90Hyp	Hyp	4.10	4.30	41	10	Shim	No	No	.005	Yes	Yes	Various	6.00/16	4	28	28	16	4.50	Disc	.....	27
28	Oldsmobile-Dynamic 6.....	Own	½F	8⅛	2½	90Hyp	90Hyp	Hyp	4.30	4.55	43	10	Shim	No	No	.005	Yes	Yes	Various	6.50/16	4	26	26	16	5.00	Disc	.....	28
29	Oldsmobile-Custom 6.....	Own	½F	8⅜	2½	90Hyp	90Hyp	Hyp	4.30	4.55	43	10	Shim	No	No	.005	Yes	Yes	Various	7.00/15	4	24	24	15	5.50	Disc	.....	29
30	Oldsmobile-Special 8.....	Own	½F	7⅛	2½	90Hyp	90Hyp	Hyp	4.10	4.30	41	10	Shim	No	No	.005	Yes	Yes	Various	6.50/16	4	26	26	16	5.00	Disc	.....	30
31	Oldsmobile-Dynamic 8.....	Own	½F	8⅛	2½	90Hyp	90Hyp	Hyp	4.30	4.55	43	10	Shim	No	No	.005	Yes	Yes	Various	6.50/16	4	26	26	16	5.00	Disc	.....	31
32	Oldsmobile-Custom 8.....	Own	½F	8⅜	2½	90Hyp	90Hyp	Hyp	4.30	4.55	43	10	Shim	No	No	.005	Yes	Yes	Various	7.00/15	4	24	24	15	5.50	Disc	.....	32
33	Packard-One Ten.....1900	Own	½F	.....	5	90Hyp	90Hyp	Hyp	4.30	.....	43	10	No	Nut	No	.004	Yes	Yes	.....	6.50/15	4	26	28	15	.....	Disc	MW	33
34	Packard-One Twenty.....1901	Own	½F	.....	6¾	90Hyp	90Hyp	Hyp	4.09	.....	45	11	No	Nut	No	.004	Yes	Yes	.....	7.00/15	4	26	28	15	.....	Disc	MW	34
35	Packard-Super Eight....1903-4-5	Own	½F	.....	6¾	90Hyp	90Hyp	Hyp	(n)	.....	(o)	(o)	No	Nut	No	.004	Yes	Yes	.....	7.00/16	(k)	(l)	(m)	16	.....	Disc	MW	35
36	Packard-Cus. Sup. Eight.1906-7-8	Own	½F	.....	6¾	90Hyp	90Hyp	Hyp	(n)	.....	(o)	(o)	No	Nut	No	.004	Yes	Yes	.....	7.00/16	(k)	(l)	(m)	16	.....	Disc	MW	36
37	Plymouth.....P-11	Own	½F	8⅝	3¼	90Hyp	90Hyp	Hyp	4.10	.....	41	10	Shim	Shim	No	.008	Yes	Yes	Goodyear	6.00/16	4	28	28	16	4.00	Disc	.....	37
38	Plymouth-Special DeLuxe...P-12	Own	½F	8⅝	3¼	90Hyp	90Hyp	Hyp	4.30	.....	43	10	Shim	Shim	No	.008	Yes	Yes	Goodyear	6.00/16	4	28	28	16	4.00	Disc	.....	38
39	Pontiac-DeLuxe 6.....41-25	Own	½F	8⅛	3¼	140Hyp	90Hyp	Hyp	4.10	3.90	41	10	Shim	Shim	No	.009	Yes	Yes	U.S., Fir, Go	6.00/16	4	28	28	16	4.50	Disc	K-M	39
40	Pontiac-Streamliner 6.....41-26	Own	½F	8⅜	3¼	140Hyp	90Hyp	Hyp	4.30	3.90	43	10	Shim	Shim	No	.009	Yes	Yes	U.S., Fir, Go	6.50/16	4	28	28	16	4.50	Disc	K-M	40
41	Pontiac-Custom 6.....41-24	Own	½F	8⅜	3¼	140Hyp	90Hyp	Hyp	4.30	3.90	43	10	Shim	Shim	No	.009	Yes	Yes	U.S., Fir, Go	6.50/16	4	28	28	16	4.50	Disc	K-M	41
42	Pontiac-DeLuxe 8.....41-27	Own	½F	8⅛	3¼	140Hyp	90Hyp	Hyp	4.10	3.90	41	10	Shim	Shim	No	.009	Yes	Yes	U.S., Fir, Go	6.00/16	4	28	28	16	4.50	Disc	K-M	42
43	Pontiac-Streamliner 8.....41-28	Own	½F	8⅜	3¼	140Hyp	90Hyp	Hyp	4.30	3.90	43	10	Shim	Shim	No	.009	Yes	Yes	U.S., Fir, Go	6.50/16	4	28	28	16	4.50	Disc	K-M	43
44	Pontiac-Custom 8.....41-29	Own	½F	8⅜	3¼	140Hyp	90Hyp	Hyp	4.30	3.90	43	10	Shim	Shim	No	.009	Yes	Yes	U.S., Fir, Go	6.50/16	4	28	28	16	4.50	Disc	K-M	44
45	Studebaker-Champion.....3G	Spi	½F	8	2½	Elco	No.28	Hyp	4.56	4.10	41	9	Shim	Shim	No	.004	Yes	Yes	Firestone	5.50/16	4	26	30	16	4.00	Disc	Budd	45
46	Studebaker-Commander 6...11A	Spi	½F	7⅞	3	90Hyp	90Hyp	Hyp	4.55	4.82	50	11	Shim	Shim	No	.004	Yes	Yes	Firestone	6.25/16	4	28	28	16	4.50	Disc	Budd	46
47	Studebaker-President 8.....7C	Spi	½F	8⅜	3	90Hyp	90Hyp	Hyp	4.55	4.82	50	11	Shim	Shim	No	.004	Yes	Yes	Firestone	7.00/16	4	28	28	16	5.00	Disc	Budd	47
48	Willys-Americar.....441	Own	½F	8	2	90Hyp	90Hyp	Hyp	4.44	.....	40	9	Shim	Shim	No	.007	Yes	Yes	Goodyear	5.50/16	4	26	26	16	3.50	Disc	KH	48

ABBREVIATIONS:

½F—Semi-floating
¾F—Three-quarter floating
(e)—5.50/16 on Traveler, 6.00/16 on DeLuxe
(f)—32 front and rear on Traveler, 26 front 30 rear on DeLuxe
(g)—3.50 on Traveler, 4.50 on DeLuxe
(h)—8⅜ on Model 11, 8.50 on Model 12
(i)—6.00/16 on Model 11, 6.25/16 on Model 12
(k)—4 ply on 1903-6, 6 ply on all others
(l)—26 lbs. Models 1903-6, 27 lbs. Models 1904-7, 28 lbs. Models 1905-8
(m)—28 lbs. Models 1903-6, 29 lbs. Models 1904-7, 32 lbs. Models 1905-8
(n)—3.92 on Models 1903-6, 4.09 on Models 1904-7, 4.36 on Models 1905-8
(o)—47-12 on Models 1903-6, 45-11 on Models 1904-7, 48-11 on Models 1905-8
Budd—Budd Wheel Co.
EP—Extreme Pressure
Fir—Firestone Tire & Rubber Co.
Go—B. F. Goodrich Co.
Gy—Goodyear Tire & Rubber Co.
Hyp—Hypoid
KH—Kelsey-Hayes Wheel Co.
K-M—Kelsey-Hayes and Motor Wheel Corp.
MW—Motor Wheel Corp.
No—No or None
SB—Spiral Bevel
Spi—Spicer Manufacturing Co.
U.S.—United States Rubber Co.

Springs and Shock Absorbers

Line Numbers	PASSENGER CAR MAKE AND MODEL	SPRINGS — FRONT — Suspensions	Type	Make	Material	Torsional Stabilizer	LEAF — Length (In.)	Width (In.)	No. of Leaves	Radius Rods	Shackled	COIL — Free Length (In.)	Length Under Curb Weight (In.)	Rate (Lb. per In.)	SPRINGS — REAR — Suspension	Type	Make	Material	Torsional Stabilizer	LEAF — Length (In.)	Width (In.)	No. of Leaves	Cover	Shackles — Type	Shackles — Make	COIL — Free Length (In.)	COIL — Length Under Curb Weight (In.)	Rate (Lb. per In.)	SHOCK ABSORBERS — Make	Type	Fluid Capacity — Front	Fluid Capacity — Rear	Line Numbers
1	Bantam 65	Con	Tra	Bur	.....	No	29¼	1½	7	Y	...	No	No	...	Con	½E	Bur	.....	No	42½	1½	6	No	Link	Own	No	No	105	Mon	OW	50cc	50cc	1
2	Buick-Special 41-40	Ind	Coil	Own	9260	Yes	No	No	No	No	No	14¼	9½	99	Con	Coil	Own	9260	Yes	No	No	No	No	No	No	17½	10	134	Del	TW	168cc	168cc	2
3	Buick-Super 41-50	Ind	Coil	Own	9260	Yes	No	No	No	No	No	14¼	9½	99	Con	Coil	Own	9260	Yes	No	No	No	No	No	No	17½	10	134	Del	TW	168cc	168cc	3
4	Buick-Century 41-60	Ind	Coil	Own	9260	Yes	No	No	No	No	No	14¼	9½	106	Con	Coil	Own	9260	Yes	No	No	No	No	No	No	17½	10	145	Del	TW	168cc	168cc	4
5	Buick-Roadmaster 41-70	Ind	Coil	Own	9260	Yes	No	No	No	No	No	14¼	9½	106	Con	Coil	Own	9260	Yes	No	No	No	No	No	No	17½	10	145	Del	TW	168cc	168cc	5
6	Buick-Limited 41-90	Ind	Coil	Own	9260	Yes	No	No	No	No	No	.....	.....	.....	Con	Coil	Own	9260	.....	No	No	No	No	No	No	.....	.....	.....	Del	TW	168cc	168cc	6
7	Cadillac-V8 61, 62, 63, 60S	Ind	Coil	Eat	9260	Yes	No	No	No	No	No	No	No	.....	Con	½E	Eat	9260	Crl	54½	2	8	.....	CL	Tray	No	No	.....	Del	TW	.042g	.042g	7
8	Cadillac-V8 67, 75	Ind	Coil	Eat	9260	Yes	No	No	No	No	No	No	No	.....	Con	½E	Eat	9260	Crl	56½	2	10	.....	CL	Tray	No	No	.....	Del	TW	.042g	.042g	8
9	Chevrolet-Special DeL. & Master DeL.	Ind	Coil	Own	SMS	Yes	No	No	No	No	No	No	No	300	Con	½E	Own	CS	No	49	1¾	8	Var	Th	Own	No	No	115	Del	TW	.....	.....	9
10	Chrysler-Royal & Windsor C-28	Ind	Coil	.....	Amola	Yes	No	No	No	No	No	.....	8¾	.....	Con	½E	.....	Amola	Yes	53⅝	1¾	9	.....	Ss	.....	No	No	.....	.....	TW	.....	.....	10
11	Chrysler-New Yorker C30N, 30K	Ind	Coil	.....	Amola	Yes	No	No	No	No	No	.....	9¾	.....	Con	½E	.....	Amola	Yes	53⅝	1¾	10	.....	Ss	.....	No	No	.....	.....	TW	.....	.....	11
12	Chrysler-Crown Imperial C33	Ind	Coil	.....	Amola	Yes	No	No	No	No	No	.....	9¾	.....	Con	½E	.....	Amola	Yes	53⅝	2	10	No	Ss	.....	No	No	.....	.....	TW	.....	.....	12
13	Crosley CB-41	Con	½E	Mat	.....	No	27	1½	5	No	F	No	No	90	Con	¼E	Mat	.....	No	21 7/16	1½	6	Own†	Ru	Own	No	No	110	Del	OW	.....	.....	13
14	De Soto-DeLuxe & Custom S-8	Ind	Coil	.....	Amola	Yes	No	No	No	No	No	.....	8¾	.....	Con	½E	.....	Amola	Yes	53⅝	1¾	8	Metal	Ss	.....	No	No	.....	.....	TW	.....	.....	14
15	Dodge-DeLuxe & Custom D-19	Ind	Coil	.....	Amola	Yes	No	No	No	No	No	.....	8¾	.....	Con	½E	.....	Amola	Yes	53⅝	1¾	9	Metal	Ss	.....	No	No	.....	.....	TW	.....	.....	15
16	Ford-DeLuxe & Super DeLuxe	Con	Tra	Own	.....	Yes	42½	2	10	Y	...	No	No	185	Con	Tra	Own	.....	.....	48	2¼	10	Metal	.....	.....	No	No	165	.....	.....	.....	.....	16
17	Hudson-DeLuxe & Traveler 6 10	Ind	Coil	Eat	9260	Yes	No	No	No	No	No	15 13/32	10 1/16	70	Con	½E	EMS	.....	Yes	52½	1¾	8	Own	SU	PM	No	No	100	Mon	TW	3¾oz	6¼oz	17
18	Hudson-Super & Commodore 6 11-12	Ind	Coil	Eat	9260	Yes	No	No	No	No	No	15 13/32	10 1/16	70	Con	½E	EMS	.....	Yes	60	1¾	8	Own	SU	PM	No	No	100	Mon	TW	3¾oz	6¼oz	18
19	Hudson-Commodore 8 14	Ind	Coil	Eat	9260	Yes	No	No	No	No	(a)	14 11/32	10 1/16	80	Con	½E	EMS	.....	Yes	60	1¾	9	Own	SU	PM	No	No	110	Del	TW	3¾oz	6¼oz	19
20	Hudson-Commodore Custom 8 17	Ind	Coil	Eat	9260	Yes	No	No	No	No	No	15 13/32	10 1/16	80	Con	½E	EMS	.....	Yes	60	1¾	8	Own	SU	PM	No	No	100	Del	TW	3¾oz	6¼oz	20
21	Lincoln-Zephyr & Continental	Con	Tra	Own	.....	Yes	44½	2	16	.....	.....	No	No	280	Con	Tra	Own	.....	.....	49	2¼	16	.....	.....	.....	No	No	230	.....	.....	.....	.....	21
22	Lincoln-Custom	Con	Tra	Own	.....	Yes	44½	2	16	.....	.....	No	No	200	Con	Tra	Own	.....	.....	49	2¼	16	.....	.....	.....	No	No	230	.....	.....	.....	.....	22
23	Mercury	Con	Tra	Own	.....	Yes	44½	2	11	.....	.....	No	No	225	Con	Tra	Own	.....	.....	48	2¼	11	.....	.....	.....	No	No	180	.....	.....	.....	.....	23
24	Nash-Ambassador 600 4140	Ind	Coil	.....	.....	No	No	No	No	No	No	14 1/16	9 7/16	175	Con	Coil	.....	.....	.....	No	No	No	No	.....	.....	16 3/16	9 13/16	125	Del	DA	.....	.....	24
25	Nash-Ambassador 6 4160	Ind	Coil	.....	.....	.....	No	No	No	No	No	15 1/16	9¼	350	Con	½E	.....	.....	.....	54 1/16	1¾	8	.....	No	No	No	No	120	Del	.....	.....	.....	25
26	Nash-Ambassador 8 4180	Ind	Coil	.....	.....	.....	No	No	No	No	No	15 5/8	9¼	350	Con	½E	.....	.....	.....	54 1/16	1¾	8	.....	No	No	No	No	.....	Del	DA	.....	.....	26
27	Oldsmobile-Special 6	Ind	Coil	Own	9260	Yes	No	No	No	No	No	14 11/32	9½	290	Con	Coil	Own	9260	Yes	No	No	No	No	No	No	17¾	9	100	Del	TW	137cc	158cc	27
28	Oldsmobile-Dynamic 6	Ind	Coil	Own	9260	Yes	No	No	No	No	No	14 11/32	9½	310	Con	Coil	Own	9260	Yes	No	No	No	No	No	No	18 11/32	10	110	Del	TW	137cc	158cc	28
29	Oldsmobile-Custom 6	Ind	Coil	Own	9260	Yes	No	No	No	No	No	14 11/32	9½	310	Con	Coil	Own	9260	Yes	No	No	No	No	No	No	18 11/32	10	110	Del	TW	137cc	158cc	29
30	Oldsmobile-Special 8	Ind	Coil	Own	9260	Yes	No	No	No	No	No	14¾	9½	325	Con	Coil	Own	9260	Yes	No	No	No	No	No	No	17¾	9	100	Del	TW	137cc	158cc	30
31	Oldsmobile-Dynamic 8	Ind	Coil	Own	9260	Yes	No	No	No	No	No	14 5/8	9½	340	Con	Coil	Own	9260	Yes	No	No	No	No	No	No	18 11/32	10	110	Del	TW	137cc	158cc	31
32	Oldsmobile-Custom 8	Ind	Coil	Own	9260	Yes	No	No	No	No	No	14 5/8	9½	340	Con	Coil	Own	9260	Yes	No	No	No	No	No	No	18 11/32	10	110	Del	TW	137cc	158cc	32
33	Packard-One Ten 1900	Ind	Coil	.....	SM	.....	No	No	No	No	No	.....	.....	(c)	Con	.....	.....	SM	.....	54¾	2	...	No	Ru	.....	No	No	(f)	(b)	(b)	.....	.....	33
34	Packard-One Twenty 1901	Ind	Coil	.....	SM	.....	No	No	No	No	No	.....	.....	(d)	Con	.....	.....	SM	.....	54⅜	2	...	No	Ru	.....	No	No	(g)	(b)	(b)	.....	.....	34
35	Packard-Super Eight 1903-4-5	Ind	Coil	.....	SM	.....	No	No	No	No	No	.....	.....	(e)	Con	.....	.....	SM	.....	54⅜	2	...	No	Ru	.....	No	No	(h)	(b)	(b)	.....	.....	35
36	Packard-Custom Super Eight 1906-7-8	Ind	Coil	.....	SM	.....	No	No	No	No	No	.....	.....	(e)	Con	.....	.....	SM	.....	54⅜	2	...	No	Ru	.....	No	No	(h)	(b)	(b)	.....	.....	36
37	Plymouth P-11	Ind	Coil	.....	Amola	No	No	No	No	No	No	.....	8¾	385	Con	½E	.....	Amola	No	53⅝	1¾	7	Metal	Ss	.....	No	No	110	.....	TW	.....	.....	37
38	Plymouth-Special DeLuxe P-12	Ind	Coil	.....	Amola	Yes	No	No	No	No	No	.....	8¾	385	Con	½E	.....	Amola	No	53⅝	1¾	9	Metal	Ss	.....	No	No	103	.....	TW	.....	.....	38
39	Pontiac-DeLuxe 6 41-25	Ind	Coil	Own	9260	Yes	No	No	No	No	No	14 11/32	10	290	Con	½E	.....	SM	No	52	2	8	Metal	Cm	Own	No	No	.....	Del	(i)	125cc	6½oz	39
40	Pontiac-Streamliner 6 41-26	Ind	Coil	Own	9260	Yes	No	No	No	No	No	15 1/16	10	290	Con	½E	.....	SM	No	52	2	8	Metal	Cm	Own	No	No	.....	Del	(i)	125cc	6½oz	40
41	Pontiac-Custom 6 41-24	Ind	Coil	Own	9260	Yes	No	No	No	No	No	15 1/16	10	290	Con	½E	.....	SM	No	52	2	8	Metal	Cm	Own	No	No	.....	Del	(i)	125cc	6½oz	41
42	Pontiac-DeLuxe 8 41-27	Ind	Coil	Own	9260	Yes	No	No	No	No	No	15 1/16	10	290	Con	½E	.....	SM	No	52	2	8	Metal	Cm	Own	No	No	.....	Del	(i)	125cc	6½oz	42
43	Pontiac-Streamliner 8 41-28	Ind	Coil	Own	9260	Yes	No	No	No	No	No	15 5/16	10	290	Con	½E	.....	SM	No	52	2	8	Metal	Cm	Own	No	No	.....	Del	(i)	125cc	6½oz	43
44	Pontiac-Custom 8 41-29	Ind	Coil	Own	9260	Yes	No	No	No	No	No	15 5/16	10	290	Con	½E	.....	SM	No	52	2	8	Metal	Cm	Own	No	No	.....	Del	(i)	125cc	6½oz	44
45	Studebaker-Champion 3G	Ind	Tra	Own	SM	No	47½	2½	12	.....	.....	No	No	.....	Con	½E	Own	SM	No	46	1¾	7	And	Ru	Har	No	No	.....	Hou	TW	1.77oz	2.28oz	45
46	Studebaker-Commander 6 11A	Ind	Tra	Own	SM	No	48	2½	16	No	.....	No	No	.....	Con	½E	Own	SM	No	54	1¾	8	Jac	Ru	Har	No	No	122	Hou	TW	.....	.....	46
47	Studebaker-President 8 7C	Ind	Tra	Own	SM	No	48	2½	18	No	.....	No	No	.....	Con	½E	Own	SM	No	54	1¾	8	Jac	Ru	Har	No	No	122	Hou	TW	.....	.....	47
48	Willys-Americar 441	Con	½E	Mat	5150	No	36¼	1¾	7	No	F	No	No	.....	Con	½E	Mat	5150	No	46	1¾	6	.....	Ru	.....	No	No	.....	Mon	DA	4¾oz	5½oz	48

ABBREVIATIONS:

†—At extra cost
¼E—One-quarter elliptic
½E—Semi-elliptic
(a)—15 13/32 inches Right, 16 5/16 inches Left
(b)—Delco two-way in front, Monroe Direct acting rear
(c)—1430x69 rate
(d)—1525x74 rate
(e)—1750x77 rate—1903-6
1870x95 rate—1904-7
2050x100 rate—1905-8
(f)—880x105 rate
(g)—970x110 rate
(h)—1040x110 rate—1903-6
1080x110 rate—1904-7
1250x122 rate—1905-8
(i)—Front—double acting. Rear—Two-way direct acting
And—Anderson Manufacturing Co.
Bur—Burton Auto Spring Corp.
cc—Cubic centimeters
CL—Compression link
Cm—Compression metal
Con—Conventional Crl—Cross link
CS—Chromium steel
DA—Direct acting
Del—Delco Products Division
Eat—Eaton Mfg. Co. Spring Div.
EMS—Eaton Mfg. Co., Mather Spring Co. & Spring Perch Co.
F—Front g—Gallons
Har—Harris Products Co.
Hou—Houde Engineering Corp.
Ind—Independent
Jac—F. L. Jacobs Co.
Mat—Mather Spring Co.
Mon—Monroe Auto Equipment Co.
No—No or None
OW—One way with lever
oz—Ounces
PM—Pressed Metals of America, Inc.
Ru—Rubber bushed
SM—Silico manganese
SMS—Silicon manganese steel
Ss—Side strap type with rubber bushinged bolts
SU—Silent "U" type
Th—Threaded Tra—Transverse
TW—Two way with lever
Tray—Trayer Products, Inc.
Var—Various Y—Yes

Steering and Brakes

Line Numbers	PASSENGER CAR MAKE AND MODEL	STEERING: Gear Type	Gear Make	Gear Ratio (to 1)	Drag Link	No of Tie Rods	Intermediate Arm	Car Turning Radius—Right (Ft.)	Caster (Deg.)	Camber (Deg.)	Toe-in (In.)	Kingpin Inclination (Deg.)	FOOT BRAKE: Make	Type	Type Lining: Primary Shoe	Type Lining: Secondary Shoe	Drums: Material	Drums: Diameter	Lining: Length per Wheel (In.)	Lining: Width (In.)	Lining: Thickness (In.)	Clearance: Toe	Clearance: Heel	Total Foot Braking Area (Sq. In.)	Per Cent Braking on Rear Wheels	HAND BRAKE: Operates on	Internal or External	Drum Diameter	Lining: Length per Drum (In.)	Lining: Width (In.)	Lining: Thickness (In.)	Clearance (In.)	Line Numbers
1	Bantam 65	CL	Ross	14.0	Lg	1	N	15.0	15	1° 15′	1/16 to 1/8	1° 30′	Own	M	Mo	Mo	St	8	13	1 5/16	11/64	SC	SC	52.0	50.0	4S	Int	8	13	1 5/16	11/64	SC	1
2	Buick-Special 41-40	BW	Sag	19.8	N	2	N	20.2	3/8 ± 3/8	N1/4 to +1 1/4	0 to 1/16	3° 30′	BD	H	Wo	Mo	CI	12	22 11/16	1 3/4	1/16	.015	.015	158.7	47.0	RS	Int	12	22 11/16	1 3/4	1/16	.015	2
3	Buick-Super 41-50	BW	Sag	19.8	N	2	N	20.2	3/8 ± 3/8	N1/8 to +1 1/8	0 to 1/16	3° 30′	BD	H	Wo	Mo	CI	12	22 11/16	1 3/4	1/16	.015	.015	158.7	47.0	RS	Int	12	22 11/16	1 3/4	1/16	.015	3
4	Buick-Century 41-60	BW	Sag	19.8	N	2	N	.....	3/8 ± 3/8	N1/8 to +1 1/8	0 to 1/16	3° 30′	BD	H	Wo	Mo	CI	12	22 11/16	2 1/4	1/16	.015	.015	206.4	47.0	RS	Int	12	22 11/16	2 1/4	1/16	.015	4
5	Buick-Roadmaster 41-70	BW	Sag	19.8	N	2	N	.....	3/8 ± 3/8	N1/8 to +1 1/8	0 to 1/16	3° 30′	BD	H	Wo	Mo	CI	12	22 11/16	2 1/4	1/16	.015	.015	206.4	47.0	RS	Int	12	22 11/16	2 1/4	1/16	.015	5
6	Buick-Limited 41-90	BW	Sag	23.6	N	2	N	23.0	3/8 ± 3/8	N1/4 to +1 1/4	0 to 1/16	3° 30′	BD	H	Wo	Mo	CI	14	26 13/16	2	1/4	.015	.015	214.6	47.0	RS	Int	14	26 13/16	2	1/4	.015	6
7	Cadillac-V8 61, 62, 63, 60S	BW	Sag	23.6	Cr	2	N	19.6	N1 3/4 to N2 3/4	N3/8 to +3/8	3/32 to 3/32	5° 51′	Ben	H	Mo	Mo	Com	12	24 1/2	2	5/16	.010	.010	208.0	45.5	RS	Int	12	24 1/2	2	5/16	.010	7
8	Cadillac-V8 67, 75	BW	Sag	23.6	Cr	2	N	(a)	N1 3/4 to N2 3/4	N3/8 to +3/8	3/32 to 3/32	5° 51′	Ben	H	Mo	Mo	Com	12	24 1/2	2 1/2	5/16	.010	.010	233.0	45.5	RS	Int	12	24 1/2	2 1/2	5/16	.010	8
9	Chevrolet-Special DeL. & Master DeL.	WR	Gem	17.5	N	2	N	.....	0 ± 1/2	N1/4 ± 1/2	0 to 1/16	4° 45′	Own	H	Mo	Mo	CW	11	22 5/8	1 3/4	1/16	(b)	(b)	158.2	47.5	RS	Int	11	22 5/8	1 3/4	1/16	(b)	9
10	Chrysler-Royal & Windsor C-28	WR	Gem	18.2	.....	2	N	.....	N1 to +1	0 to +3/4	0 to 1/8	4 3/4 to 6	Loc	H	Mo	Mo	Cen	11	19 7/16	2	13/64	.012	.006	155.5	40.0	PS	Ext	(c)	(d)	2	5/32	.017	10
11	Chrysler-New Yorker C30N, 30K	WR	Gem	18.2	.....	2	N	.....	N1 to +1	0 to +3/4	0 to 1/8	4 3/4 to 6	Loc	H	Mo	Mo	Cen	12	(e)	2	13/64	(f)	(f)	189.2	39.0	PS	Ext	7	20 1/8	2 1/2	5/32	.017	11
12	Chrysler-Crown Imperial C33	WR	Gem	20.4	.....	2	N	.....	N1 to +1	0 to +3/4	0 to 1/8	4 3/4 to 6	Loc	H	Mo	Mo	Cen	12	(e)	2	13/64	(f)	(f)	189.2	39.0	PS	Ext	7	20 1/8	2 1/2	5/32	.017	12
13	Crosley CB-41	CL	Ross	17.0	Lg	1	N	34.0	6 1/2 to 11	2	1/16 to 3/64	6° 30′	Haw	M	Wo	Wo	St	6	18 1/4	1	5/32	(g)	(g)	150.4	50.0	RS	Int	6	18 1/4	1	5/32	(g)	13
14	De Soto-DeLuxe & Custom S-8	WR	Gem	18.2	.....	2	N	.....	N1 to +1	0 to +3/4	0 to 1/8	4 3/4 to 6	Loc	H	Mo	Mo	CI	11	19 7/16	2	13/64	.012	.006	155.5	40	PS	Ext	6	17 1/16	2	5/32	.017	14
15	Dodge-DeLuxe & Custom D-19	WR	Gem	18.2	.....	2	N	.....	N1 to +1	0 to +3/4	0 to 1/8	4 3/4 to 6	Loc	H	Mo	Mo	CI	11	19 7/16	2	13/64	.012	.006	155.5	40	PS	Ext	6	17 1/16	2	5/32	.017	15
16	Ford-DeLuxe & Super DeLuxe	WR	Gem	18.2	.....	1	N	19	4 1/2 to 9	1/4 to 1	1/16	8	.....	H	Wo	Mo	CI	12	23.3	1 3/4	.020	.....	.....	163.0	45	RS	Int	12	23.3	1 3/4	.020	.....	16
17	Hudson-DeLuxe & Traveler 6 10	WR	Gem	18.2	Lg	2	Y	20.8	0 ± 1/4	1/32 ± 1/32	1/32 ± 1/32	3° 36′	Ben	D	Mo	Wo	St	10	19.8	1 3/4	1/16	.010	.010	138.9	50	RS	Int	10	19.8	1 3/4	1/16	.010	17
18	Hudson-Super & Commodore 6 11-12	WR	Gem	18.2	Lg	2	Y	21.3	0 ± 1/4	1/32 ± 1/32	1/32 ± 1/32	3° 36′	Ben	D	Mo	Wo	St	(h)	(i)	1 3/4	(k)	.010	.010	(m)	50	RS	Int	(h)	(i)	1 3/4	(k)	.010	18
19	Hudson-Commodore 8 14	WR	Gem	18.4	Lg	2	Y	21.3	0 ± 1/4	1/32 ± 1/32	1/32 ± 1/32	3° 36′	Ben	D	Mo	Wo	St	11	21.5	1 3/4	3/32	.010	.010	141.1	50	RS	Int	11	21.5	1 3/4	3/32	.010	19
20	Hudson-Commodore Custom 8 17	WR	Gem	18.4	Lg	2	Y	22.0	0 ± 1/4	1/32 ± 1/32	1/32 ± 1/32	3° 36′	Ben	D	Mo	Wo	St	11	21.5	1 3/4	3/32	.010	.010	141.1	50	RS	Int	11	21.5	1 3/4	3/32	.010	20
21	Lincoln-Zephyr & Continental	WR	Gem	18.4	.....	1	N	22.0	3 to 5	1/4 to 3/4	1/16	3 3/4 — 4 3/4	.....	H	Mo	Wo	CI	12	23.9	1 3/4	.021	.....	.....	168.0	.....	RS	Int	12	23.9	1 3/4	.021	.....	21
22	Lincoln-Custom	WR	Gem	18.4	.....	1	N	22.0	3 to 5	1/4 to 3/4	1/16	3 3/4 — 4 3/4	.....	H	Mo	Wo	CI	12	23.9	1 3/4	.021	.....	.....	168.0	.....	RS	Int	12	23.9	1 3/4	.021	.....	22
23	Mercury	WR	Gem	18.2	.....	1	N	20.0	4 1/2 to 9	1/4 to 1	1/16	8	.....	H	Wo	Mo	CI	12	23.3	1 3/4	.020	.....	.....	163.0	.....	RS	Int	12	23.3	1 3/4	.020	.....	23
24	Nash-Ambassador 600 4140	WR	Gem	18.2	Tra	2	N	16.5	0 to 0	0 to 1/2	0 to 1/16	5° 30′	Ben	H	Mo	Mo	CI	9	20.5	1 3/4	3/16	.....	.....	143.5	.....	RS	Int	9	20.5	1 3/4	3/16	.....	24
25	Nash-Ambassador 6 4160	WR	Gem	18.2	.....	2	N	19.0	0 to N1/2	1/4 to 3/4	3/32 to 3/32	4° 30′	Ben	H	Mo	Mo	CI	10	22.0	2	1/16	.010	.010	176.0	47	RS	Int	10	22.0	2	1/16	.010	25
26	Nash-Ambassador 8 4180	WR	Gem	20.2	.....	2	.....	19.7	0 to N1/2	1/4 to 3/4	3/32 to 3/32	4° 30′	Ben	H	Mo	Mo	CI	10	22.0	2	1/16	.010	.010	176.0	47	RS	Int	10	22.0	2	1/16	.010	26
27	Oldsmobile-Special 6	WR	SG	19.0	Tra	2	N	18.5	0 to N3/4	N1/4 to N3/4	1/16 to 1/8	4° 51′ 10″	Var	H	Mo	Mo	CI	10	21 5/16	1 3/4	1/16	.015	.015	148.0	45	RS	Int	11	21 5/16	1 3/4	1/16	.015	27
28	Oldsmobile-Dynamic 6	WR	SG	19.0	Tra	2	N	19.7	0 to N3/4	N1/4 to N3/4	1/16 to 1/8	4° 51′ 10″	Var	H	Mo	Mo	CI	11	21 5/16	2	1/16	.015	.015	170.5	45	RS	Int	11	21 5/16	2	1/16	.015	28
29	Oldsmobile-Custom 6	WR	SG	19.0	Tra	2	N	19.7	0 to N3/4	N1/4 to N3/4	1/16 to 1/8	4° 51′ 10″	Var	H	Mo	Mo	CI	11	21 5/16	2	1/16	.015	.015	170.5	45	RS	Int	11	21 5/16	2	1/16	.015	29
30	Oldsmobile-Special 8	WR	SG	19.0	Tra	2	N	18.5	0 to N3/4	N1/4 to N3/4	1/16 to 1/8	4° 51′ 10″	Var	H	Mo	Mo	CI	11	21 5/16	1 3/4	1/16	.015	.015	148.0	45	RS	Int	11	21 5/16	1 3/4	1/16	.015	30
31	Oldsmobile-Dynamic 8	WR	SG	19.0	Tra	2	N	19.7	0 to N3/4	N1/4 to N3/4	1/16 to 1/8	4° 51′ 10″	Var	H	Mo	Mo	CI	11	21 5/16	2	1/16	.015	.015	170.5	45	RS	Int	11	21 5/16	2	1/16	.015	31
32	Oldsmobile-Custom 8	WR	SG	19.0	Tra	2	N	19.7	0 to N3/4	N1/4 to N3/4	1/16 to 1/8	4° 51′ 10″	Var	H	Mo	Mo	CI	11	21 5/16	2	1/16	.015	.015	170.5	45	RS	Int	11	21 5/16	2	1/16	.015	32
33	Packard-One Ten 1900	WR	Gem	20.2	.....	.....	.....	20.5	1/2 ± 1/2	1/4 — 3/4 — 0	0 + 1/16 — 0	2° 30′	Ben	H	.....	.....	Cen	11	22 5/8	1 3/4	1/16	.....	.....	158.5	.....	RS	Int	11	22 5/8	1 3/4	1/16	.....	33
34	Packard-One Twenty 1901	WR	Gem	20.2	.....	.....	.....	21.2	1/2 ± 1/2	1/2 — 3/4 — 0	0 + 1/16 — 0	2° 30′	Ben	H	.....	.....	Cen	12	24 1/2	1 3/4	1/16	.....	.....	171.5	.....	RS	Int	12	24 1/2	1 3/4	1/16	.....	34
35	Packard-Super Eight 1903-4-5	WR	Gem	20.2	.....	.....	.....	(n)	N3/4 ± 1/2	1/2 — 3/4 — 0	0 + 1/16 — 0	2° 30′	Ben	H	.....	.....	Cen	12	(s)	(r)	1/16	.....	.....	(p)	.....	RS	Int	12	(s)	(r)	1/16	.....	35
36	Packard-Custom Super Eight 1906-7-8	WR	Gem	20.2	.....	.....	.....	(n)	N3/4 ± 1/2	1/2 — 3/4 — 0	0 + 1/16 — 0	2° 30′	Ben	H	.....	.....	Cen	12	(s)	(r)	1/16	.....	.....	(p)	.....	RS	Int	12	(s)	(r)	1/16	.....	36
37	Plymouth P-11	WR	Gem	18.2	.....	2	N	.....	N1 to +1	0 to +3/4	0 to 1/16	4 3/4 to 6	Loc	H	Mo	Mo	Cen	10	18	2	13/64	.012	.006	144.0	45	PS	Ext	6	17 1/16	2	5/32	.017	37
38	Plymouth-Special DeLuxe P-12	WR	Gem	18.2	.....	2	N	.....	N1 to +1	0 to +3/4	0 to 1/8	4 3/4 to 6	Loc	H	Mo	Mo	Cen	10	18	2	13/64	.012	.006	144.0	45	PS	Ext	6	17 1/16	2	5/32	.017	38
39	Pontiac-DeLuxe 6 41-25	WR	SG	19.0	Tra	2	N	19.2	N1/2 to N1	0	0 to 1/16	4 5/8	Ben	H	Mo	Mo	CN	11	21 5/16	1 3/4	1/16	.015	.015	149.0	47	RS	Int	11	21 5/16	1 3/4	1/16	.015	39
40	Pontiac-Streamliner 6 41-26	WR	SG	19.0	Tra	2	N	20.3	N1/2 to N1	0	0 to 1/16	4 5/8	Ben	H	Mo	Mo	CN	11	21 5/16	1 3/4	1/16	.015	.015	149.0	47	RS	Int	11	21 5/16	1 3/4	1/16	.015	40
41	Pontiac-Custom 6 41-24	WR	SG	19.0	Tra	2	N	20.3	N1/2 to N1	0	0 to 1/16	4 5/8	Ben	H	Mo	Mo	CN	11	21 5/16	1 3/4	1/16	.015	.015	149.0	47	RS	Int	11	21 5/16	1 3/4	1/16	.015	41
42	Pontiac-DeLuxe 8 41-27	WR	SG	19.0	Tra	2	N	19.2	N1/2 to N1	0	0 to 1/16	4 5/8	Ben	H	Mo	Mo	CN	11	21 5/16	1 3/4	1/16	.015	.015	149.0	47	RS	Int	11	21 5/16	1 3/4	1/16	.015	42
43	Pontiac-Streamliner 8 41-28	WR	SG	19.0	Tra	2	N	20.3	N1/2 to N1	0	0 to 1/16	4 5/8	Ben	H	Mo	Mo	CN	11	21 5/16	1 3/4	1/16	.015	.015	149.0	47	RS	Int	11	21 5/16	1 3/4	1/16	.015	43
44	Pontiac-Custom 8 41-29	WR	SG	19.0	Tra	2	N	20.3	N1/2 to N1	0	0 to 1/16	4 5/8	Ben	H	Mo	Mo	CN	11	21 5/16	1 3/4	1/16	.015	.015	149.0	47	RS	Int	11	21 5/16	1 3/4	1/16	.015	44
45	Studebaker-Champion 3G	CL	Ross	14.2	Tra	3	Y	20.0	1 to 2	1/2	1/16 to 3/32	5° 30′	Loc	H	Mo	Mo	Com	9	17 3/4	1 3/4	1/16	.010	.005	124.0	43	RS	Int	9	17 3/4	1 3/4	1/16	.....	45
46	Studebaker-Commander 6 11A	CL	Ross	14.0	Tra	3	Y	21.5	N1/4 to +1/2	1/2	1/16 to 3/32	5° 30′	Loc	H	Mo	Mo	Com	11	19 11/16	2	1/16	.010	.005	150.0	45	RS	Int	11	19 11/16	2	1/16	.....	46
47	Studebaker-President 8 7C	CL	Ross	14.0	Tra	3	Y	.....	N1/4 to +1/2	1/2	1/16 to 3/32	5° 30′	Loc	H	Mo	Mo	Com	11	19 11/16	2 1/4	1/16	.010	.005	169.0	45	RS	Int	11	19 11/16	2 1/4	1/16	.....	47
48	Willys-Americar 441	CL	Ross	14.0	Lg	1	N	18.0	3	2	3/32 to 3/32	7° 30′	Ben	H	Mo	Mo	CN	9	18 5/8	1 3/4	1/16	.008	.005	130.0	43	RS	Int	9	18 5/8	1 3/4	1/16	.....	48

ABBREVIATIONS:

4S—Four service brakes
(a)—22.3 feet Model 67, 22 feet Model 75
(b)—Adjust to slight drag, back off 4 notches
(c)—7 inches on C-28W, 6 inches on C-28S
(d)—20 1/8 inches on C-28W. 17 1/16 inches on C-28S
(e)—Front 25 1/8, rear 22 3/16
(f)—Rear shoes, rear wheels, toe .007, heel .007. All other shoes front and rear, toe .006, heel .007
(g)—Floating just clear of drag
(h)—Model 11—10 inches, Model 12—11 inches
(i)—Model 11—19.8 inches, Model 12—21.6 inches
(k)—Model 11—1/16, Model 12—3/32
(m)—Model 11—138.9, Model 12—141.15
(n)—22 1/2 ft. on 1903-6; 24 ft. on 1904-7. 24 1/2 ft. on 1905-8.
(p)—196 sq. in. on 1903-6; 234 sq. in. on 1904-5-7-8.
(r)—2 inches on 1903-6; 2 1/4 inches on 1904-5-7-8.
(s)—24 1/2 on 1903-6; 26 on 1904-5-7-8.
Ben—Bendix Products Div.
BD—Bendix or Delco
BW—Ball Bearing—worm and nut
Cen—Centrifugal
CL—Cam and lever
Com—Composite
CW—Cast iron rim, steel web
D—Duo automatic
CI—Cast Iron
CN—Chrome nickel
Cr—Cross relay
Ext—External
Gem—Gemmer Manufacturing Co.
H—Hydraulic
Haw—Hawley
Int—Internal
Lg—Longitudinal
Loc—Lockheed
Mo—Molded
PS—Propeller shaft
Ross—Ross Gear & Tool Co.
M—Mechanical
N—No, None or Negative
RS—Rear service brakes
Sag—Saginaw Steering Gear Div.
SC—Self centralizing
SG—Saginaw Div. or Gemmer Mfg. Co.
St—Steel
Tra—Transverse
Var—Various
Wo—Woven
WR—Worm and roller
Y—Yes

Bearings—Rear Axle, King Pin and Wheel

Line Numbers	PASSENGER CAR MAKE AND MODEL	REAR AXLE		KING PIN				WHEELS			Line Numbers
		PINION OR WORM SHAFT							FRONT		
		Front	Rear	Differential	Upper	Lower	Thrust	Rear	Inner	Outer	
1	Bantam 65	Tim 15100-15250	Tim 15100-15250	Tim 14138-14277	Bz $\frac{1}{2}$x$\frac{5}{8}$x1$\frac{3}{8}$	Bz $\frac{1}{2}$x$\frac{5}{8}$x1$\frac{3}{8}$	None	Tim 1757-1729	Tim 07998-07204	Tim 05062-05185	1
2	Buick-Special 41-40	ND 5607	Hy C-1507	Hy KA-11445-Z	Sb .863x.987x1$\frac{1}{4}$	Sb .863x.987x1$\frac{1}{4}$	HN 148393 or 134630	Hy 1502	ND 909062	ND 909025	2
3	Buick-Super 41-50	ND 5607	Hy C-1507	Hy KA-11445-Z	Sb .863x.987x1$\frac{1}{4}$	Sb .863x.987x1$\frac{1}{4}$	HN 148393 or 134630	Hy 1502	ND 909062	ND 909025	3
4	Buick-Century 41-60	ND 5607	Hy C-1507	Hy KA-11445-Z	Sb .863x.987x1$\frac{1}{4}$	Sb .863x.987x1$\frac{1}{4}$	HN 148393 or 134630	Hy 1502	ND 909062	ND 909025	4
5	Buick-Roadmaster 41-70	ND 5607	Hy C-1507	Hy KA-11445-Z	Sb .863x.987x1$\frac{1}{4}$	Sb .863x.987x1$\frac{1}{4}$	HN 148393 or 134630	Hy 1502	ND 909062	ND 909025	5
6	Buick-Limited 41-90	ND 5607	Hy C-1507	Hy KA-11630-Z	Sb .850x1.181x1$\frac{9}{16}$	Sb .850x1.181x1$\frac{9}{16}$	Nice 1289123	Hy 1508	ND 909028	ND 909027	6
7	Cadillac-V8 61, 62, 63, 60S	Tim 3880-3820	Tim 3779-3732	Tim 25584-25528	Bz $\frac{3}{4}$x1$\frac{1}{16}$x1$\frac{1}{4}$	Bz $\frac{3}{4}$x1$\frac{1}{16}$x1$\frac{1}{4}$	Spb 1438440GM	ND 88128	ND 909062	ND 909025	7
8	Cadillac-V8 67, 75	Tim 3880-3820	Tim 49580-49520	(a)	Bz $\frac{3}{4}$x1$\frac{1}{16}$x1$\frac{1}{4}$	Bz $\frac{3}{4}$x1$\frac{1}{16}$x1$\frac{1}{4}$	Spb 1438440GM	ND 88128	ND 909062	ND 909025	8
9	Chevrolet-Special DeL. & Master DeL.	ND 5306	Hy C-1506	Hy KA-11360-Z	Bz $\frac{7}{8}$x1$\frac{3}{4}$x1$\frac{1}{16}$	Bz $\frac{7}{8}$x1$\frac{3}{4}$x1$\frac{1}{16}$	ND $\frac{7}{8}$x$\frac{3}{16}$	Hy 1500	ND 909052	ND 909001	9
10	Chrysler-Royal & Windsor C-28	Tim 31590-31520	Tim 31593-31520	Tim 25580-25520	Tor NB-15	Lbs .797x.925x1.200	BB .803x1.563x.563	Tim 25877-25821	Tim 14123-14276	Tim 09074-09194	10
11	Chrysler-New Yorker C30N, 30K	Tim 3476-3420	Tim 3875-3820	Tim 25580-25520	Tor NB-19	Tor NB-19	BB .944x1.750x.625	Tim 2780-2736	Tim 2585-2523	Tim 1755-1729	11
12	Chrysler-Crown Imperial C33	Tim 3878-3820	Tim 46176-46368	Tim 28580-28521	Tor NB-19	Tor NB-19	BB .944x1.750x.625	Tim 26880-26822	Tim 2877-2820	Tim 1280-1220	12
13	Crosley CB-41	Tim 1380-1328	Tim 1380-1328	Tim 14138-14277	Bz	Bz		Tim 15575T-15520	Tim 1380-1328	Tim 17580-17520	13
14	De Soto-DeLuxe & Custom S-8	B-T 31590-31520	B-T 31593-31520	B-T 25580-25520	Tor NB-15	Lbs .797x.925x1.200	BB .803x1.563x.563	B-T 25877-25821	B-T 14123-14276	B-T 09074-09194	14
15	Dodge-DeLuxe & Custom D-19	B-T 31590-31520	B-T 31593-31520	B-T 25580-25520	Lbs .797x.925x1.200	Lbs .797x.925x1.200	BB .803x1.563x.563	B-T 25877-25821	B-T 14123-14276	B-T 09074-09194	15
16	Ford-DeLuxe & Super DeLuxe	Tim 799056-799055(2)		Tim 799115-799116					Tim 799072-799076	Tim 799061-799065	16
17	Hudson-DeLuxe & Traveler 6 10	Tim 02876-02820	Tim 31594-31520	Bow 24780-24720				Tim 2581T-2523	B-T 15118-15250	Tim 09078-09195	17
18	Hudson-Super & Commodore 6 11-12	Tim 02876-02820	Tim 31594-31520	Bow 24780-24720				Tim 25877T-25821	B-T 15118-15250	Tim 09078-09195	18
19	Hudson-Commodore 8 14	Tim 02876-02820	Tim 31594-31520	Bow 24780-24720				Tim 25877T-25821	B-T 15118-15250	Tim 09078-09195	19
20	Hudson-Commodore Custom 8 17	Tim 02876-02820	Tim 31594-31520	Bow 24780-24720				Tim 25877T-25821	B-T 15118-15250	Tim 09078-09195	20
21	Lincoln-Zephyr & Continental										21
22	Lincoln-Custom										22
23	Mercury	Tim 799056-799055(2)		Tim 799115-799116					Tim 799072-799076	Tim 799061-799065	23
24	Nash-Ambassador 600 4140								Tim 14138A-14274	Tim 12580-12520	24
25	Nash-Ambassador 6 4160	Tim 31590-31520	Tim 3877-3820	Tim 25580-25523				Tim 2798T-2729	Tim 14138A-14274	Tim 12580-12520	25
26	Nash-Ambassador 8 4180	Tim 31590-31520	Tim 3877-3820	Tim 25580-25523				Tim 26876T-26820	Tim 14138A-14274	Tim 12580-12520	26
27	Oldsmobile-Special 6	ND 5306	Hy C-1509	Hy A-165275-Z	BSb 231905 GM	BSb 231905 GM	ND 230679 GM	ND 88128	ND 909052	ND 909001	27
28	Oldsmobile-Dynamic 6	ND 5306	Hy C-1509	Hy A-165275-Z	BSb 231905 GM	BSb 231905 GM	ND 230679 GM	ND 88128	ND 909052	ND 909001	28
29	Oldsmobile-Custom 6	ND 5306	Hy C-1509	Hy A-165275-Z	BSb 231905 GM	BSb 231905 GM	ND 230679 GM	ND 88128	ND 909052	ND 909001	29
30	Oldsmobile-Special 8	ND 5306	Hy C-1509	Hy A-165275-Z	BSb 231905 GM	BSb 231905 GM	ND 230679 GM	ND 88128	ND 909052	ND 909001	30
31	Oldsmobile-Dynamic 8	ND 5306	Hy C-1509	Hy A-165275-Z	BSb 231905 GM	BSb 231905 GM	ND 230679 GM	ND 88128	ND 909052	ND 909001	31
32	Oldsmobile-Custom 8	ND 5306	Hy C-1509	Hy A-165275-Z	BSb 231905 GM	BSb 231905 GM	ND 230679 GM	ND 88128	ND 909052	ND 909001	32
33	Packard-One Ten 1900	Tim 31590-31520	Tim 3877-3820-A	Tim 25580-25520	.866x1.187x1.089	.866x1.187x1.089	Ald	Tim 25877-25821(2)	Tim 14138-14276	Tim 09074-09194	33
34	Packard-One Twenty 1901	Tim 3879-3820	Tim 3776A-3735	Tim 2984-2924	.866x1.875x1.089	.866x1.815x1.089	Ald	Tim 26878-26830	Tim 2585-2523	Tim 1380-1329	34
35	Packard-Super Eight 1903-4-5	Tim 3879-3820	Tim 3776A-3735	Tim 2984-2924	.855x1.189x1.187	.855x1.189x1.187	BB	(b)	Tim 2585-2523	Tim 1380-1329	35
36	Packard-Custom Super Eight 1906-7-8	Tim 3879-3820	Tim 3776A-3735	Tim 2984-2924	.855x1.189x1.187	.855x1.189x1.187	BB	(b)	Tim 2585-2523	Tim 1380-1329	36
37	Plymouth P-11	Tim 31590-31520	Tim 31593-31520	Tim 25580-25520	Lbs .797x.925x1.200	Lbs .797x.925x1.200	BB .803x1.563x.563	Tim 25877-25821	Tim 14123-14276	Tim 09074-09194	37
38	Plymouth-Special DeLuxe P-12	Tim 31590-31520	Tim 31593-31520	Tim 25580-25520	Lbs .797x.925x1.200	Lbs .797x.925x1.200	BB .803x1.563x.563	Tim 25877-25821	Tim 14123-14276	Tim 09074-09194	38
39	Pontiac-DeLuxe 6 41-25	ND 5306	Hy C-1509	Hy A-165275-Z	Bz .863x1.054x1$\frac{1}{4}$	Bz .863x1.054x1$\frac{1}{4}$	Spb 230679 GM	ND 954172 GM	ND 909052	ND 909001	39
40	Pontiac-Streamliner 6 41-26	ND 5306	Hy C-1509	Hy A-165275-Z	Bz .863x1.054x1$\frac{1}{4}$	Bz .863x1.054x1$\frac{1}{4}$	Spb 230679 GM	ND 954172 GM	ND 909052	ND 909001	40
41	Pontiac-Custom 6 41-24	ND 5306	Hy C-1509	Hy A-165275-Z	Bz .863x1.054x1$\frac{1}{4}$	Bz .863x1.054x1$\frac{1}{4}$	Spb 230679 GM	ND 954172 GM	ND 909052	ND 909001	41
42	Pontiac-DeLuxe 8 41-27	ND 5306	Hy C-1509	Hy A-165275-Z	Bz .863x1.054x1$\frac{1}{4}$	Bz .863x1.054x1$\frac{1}{4}$	Spb 230679 GM	ND 954172 GM	ND 909052	ND 909001	42
43	Pontiac-Streamliner 8 41-28	ND 5306	Hy C-1509	Hy A-165275-Z	Bz .863x1.054x1$\frac{1}{4}$	Bz .863x1.054x1$\frac{1}{4}$	Spb 230679 GM	ND 954172 GM	ND 909052	ND 909001	43
44	Pontiac-Custom 8 41-29	ND 5306	Hy C-1509	Hy A-165275-Z	Bz .863x1.054x1$\frac{1}{4}$	Bz .863x1.054x1$\frac{1}{4}$	Spb 230679 GM	ND 954172 GM	ND 909052	ND 909001	44
45	Studebaker-Champion 3G	Tim 02872-02820	Tim 31593-31520	Tim 24780-24721	Tor B-1816	Bbc 1$\frac{1}{16}$x1$\frac{1}{4}$x$\frac{3}{4}$	Nice 5136	Tim 14123T-14276	Tim 15580-15520	Tim 09074-09194	45
46	Studebaker-Commander 6 11A	Tim 02872-02820	Tim 31593-31520	Tim 25577-25523	Tor B-2016	Bbc 1.190x1.316x1$\frac{1}{4}$	Nice 5920	Tim 25877-25821	Tim 14125A-14274	Tim 09074-09194	46
47	Studebaker-President 8 7C	Tim 02872-02820	Tim 31593-31520	Tim 25577-25523	Tor B-2016	Bbc 1.190x1.316x1$\frac{1}{4}$	Nice 5920	Tim 25877-25821	Tim 14125A-14274	Tim 09074-09194	47
48	Willys-Americar 441	Tim 02872-02820	Tim 31593-31520	Tim 24780-24721			Mat 7206-T3	Tim 14123T-14276	Tim 15118-15250	Tim 09074-09194	48

ABBREVIATIONS:

(2)—Two used
(a)—Timken 25584T-25528 right
Timken 28577T-28521 left
(b)—Timken 26878-26830 on Models 1903-4-6-7
Timken 3576-3525 on Models 1905-8
Ald—Antimony lead
BB—Ball bearing
Bbc—Bound Brook Co.
Bow—Bower Roller Bearing Co.
BSb—Bronze—steel backed
B-T—Bower Roller Bearing Co. or Timken Roller Bearing Co.
Bz—Bronze
GM—General Motors number
HN—Hoover Ball & Bearing Co. or Nice Ball Bearing Co.
Hy—Hyatt Bearing Div.
Lbs—Lead bronze steel backed
Mat—Matthews Manufacturing Co.
ND—New Departure Division
Sb—Split bushing
Spb—Special ball bearing
Tim—Timken Roller Bearing Div.
Tor—Torrington Company
Note: Timken and Bower bearing numbers are shown in the order of cone first and then cup.

Bearings—Electrical Units, Clutch, Transmission

Line Numbers	PASSENGER CAR MAKE AND MODEL	WATER PUMP	STARTER		GENERATOR		CLUTCH		TRANSMISSION					Line Numbers
		Shaft and Bearing Assembly	Commutator End	Drive End	Commutator End	Drive End	Pilot	Throwout	Drive Shaft Rear	MAIN SHAFT Front Pilot	MAIN SHAFT Rear	Counter Shaft	Reverse Idler	
1	Bantam.....65	None	Bz $\frac{7}{16}$x$\frac{9}{16}$x$\frac{1}{2}$	Bz $\frac{13}{16}$x$\frac{14}{16}$x$\frac{7}{8}$	SAE 201	SAE 202	Hy 93218	AB A-935-1	.....	An 1207	An 1305	Sb $\frac{33}{64}$x$\frac{3}{4}$x1$\frac{1}{4}$	Sb $\frac{5}{8}$x$\frac{3}{4}$x$\frac{31}{32}$	1
2	Buick-Special.....41-40	ND 885156	CI .563x$\frac{31}{32}$	OB .500x.562x$\frac{25}{32}$	Bu .562x.783x$\frac{51}{64}$	ND 3203	ND 7109	BCA 1308159 (GM)	ND 47507	Rol 1294780 (GM)	ND 3206	Rol 1302154 (GM)	Sb 1307898 (GM)	2
3	Buick-Super.....41-50	ND 885156	CI .563x$\frac{31}{32}$	OB .500x.562x$\frac{25}{32}$	Bu .562x.783x$\frac{51}{64}$	ND 3203	ND 7109	BCA 1308159 (GM)	ND 47507	Rol 1294780 (GM)	ND 3206	Rol 1302154 (GM)	Sb 1307898 (GM)	3
4	Buick-Century.....41-60	ND 885156	CI .563x$\frac{1}{16}$	OB .563x.625x$\frac{3}{4}$	Bu .562x.783x$\frac{51}{64}$	ND 3203	ND 7109	BCA 1302299 (GM)	ND 47507	Rol 1294780 (GM)	ND 43306	Rol 1298445 (GM)	Bu 1321609 (GM)	4
5	Buick-Roadmaster.....41-70	ND 885156	CI .563x$\frac{1}{16}$	OB .563x.625x$\frac{3}{4}$	Bu .562x.783x$\frac{51}{64}$	ND 3203	ND 7109	BCA 1302299 (GM)	ND 47507	Rol 1294780 (GM)	ND 43306	Rol 1298445 (GM)	Bu 1321609 (GM)	5
6	Buick-Limited.....41-90	ND 885156	CI .563x$\frac{1}{16}$	OB .563x.625x$\frac{3}{4}$	Bu .562x.783x$\frac{51}{64}$	ND 3203	ND 7109	BCA 1302299 (GM)	ND 47507	Rol 1294780 (GM)	ND 43306	Rol 1298445 (GM)	Bu 1321609 (GM)	6
7	Cadillac-V8.....61, 62, 63, 60S	ND 88016	CI	Bz $\frac{3}{4}$x$\frac{1}{16}$x$\frac{23}{32}$	Bz $\frac{5}{16}$x$\frac{3}{4}$x$\frac{3}{4}$	ND 3203	ND 7109	BCA CTDS-56	ND 47508	Hy 1294780 (GM)	ND 47508-7	Nb	SSb $\frac{7}{8}$x1x1	7
8	Cadillac-V8.....67, 75	ND 88016	CI	Bz $\frac{3}{4}$x$\frac{1}{16}$x$\frac{23}{32}$	Bz $\frac{5}{16}$x$\frac{3}{4}$x$\frac{3}{4}$	ND 3203	ND 7109	BCA CTDS-56	ND 47508	Hy 1294780 (GM)	ND 47508-7	Nb	SSb $\frac{7}{8}$x1x1	8
9	Chevrolet-Spec. DeL. & Mas. DeL.	ND 885167	$\frac{1}{2}$x$\frac{13}{16}$	None	Bz $\frac{13}{64}$x$\frac{1}{16}$x$\frac{21}{64}$	ND 3203	Hy 99004	ND CT-22	ND 43207	ND 954141 (GM)	ND 43305	Bz $\frac{3}{4}$x$\frac{7}{8}$x$\frac{3}{4}$	Bz $\frac{3}{4}$x$\frac{7}{8}$x$\frac{3}{4}$	9
10	Chrys.-Roy. & Windsor.....C-28	OL (a)	(b)	(c)	(m)	SAE 203	OL .753x.941x.875	AB A935-1 or BCA 4950-A	(e)	14 rollers .2181x.5313	(g)	22 rollers .1249x.9305	22 rollers .1249x.9305	10
11	Chrysler-New Yorker..C30N, 30K	MR 5200-FFS-4	(b)	(c)	(m)	SAE 203	(d)	AB A-903	(f)	14 rollers .2181x.5313	(g)	22 rollers .1249x.9305	22 rollers .1249x.9305	11
12	Chrysler-Crown Imperial.....C33	MR 5200-FFS-4	(b)	(c)	(m)	SAE 203	(d)	AB A-903	(f)	14 rollers .2181x.5313	(g)	22 rollers .1249x.9305	22 rollers .1249x.9305	12
13	Crosley.....CB-41	None	.....	.....	.....	.....	OL	AB CTDS-54	Fed 1205-CG	Cle No. 8	Fed 1204-FF	Cle No. 8	Cle No. 8	13
14	De Soto-DeLuxe & Custom...S-8	OL (a)	(b)	(c)	(m)	SAE 203	OL .753x.941x.875	AB A935-1 or BCA 4950-A	(e)	14 rollers .2181x.5313	(g)	22 rollers .1249x.9305	22 rollers .1249x.9305	14
15	Dodge-DeLuxe & Custom...D-19	OL (a)	(b)	(c)	(m)	SAE 203	OL .753x.941x.875	AB A935-1 or BCA 4950-A	(h)	14 rollers .2181x.5313	(g)	22 rollers .1249x.9305	22 rollers .1249x.9305	15
16	Ford-DeLuxe & Super DeLuxe...	.....	.....	.....	.....	.....	.....	AB A-893	.....	.....	.....	.....	.....	16
17	Hudson-DeLuxe & Traveler 6..10	.....	AL MZ-40-A	AL MAB-124	AL GBF-79	SAE 203	.....	BCA 1.625x2.593	.....	Ban .1875x.527	ND	SSb	SSb	17
18	Hudson-Super & Comm. 6..11-12	.....	AL MZ-40-A	AL MAB-124	AL GBF-79	SAE 203	.....	BCA 1.625x2.593	.....	Ban .1875x.527	ND	SSb	SSb	18
19	Hudson-Commodore 8.....14	.....	AL MZ-40-A	AL MAB-124	AL GBF-79	SAE 203	.....	BCA 1.625x2.593	.....	Ban .1875x.527	ND	SSb	SSb	19
20	Hudson-Comm. Custom 8.....17	.....	AL MZ-40-A	AL MAB-124	AL GBF-79	SAE 203	.....	BCA 1.625x2.593	.....	Ban .1875x.527	ND	SSb	SSb	20
21	Lincoln-Zephyr & Continental....	.....	.....	.....	.....	.....	.....	AB A-893	.....	.....	.....	.....	.....	21
22	Lincoln-Custom.....	.....	.....	.....	.....	.....	.....	AB A-893	.....	.....	.....	.....	.....	22
23	Mercury.....	.....	.....	.....	.....	.....	.....	AB A-893	.....	.....	.....	.....	.....	23
24	Nash-Ambassador 600.. 4140	.....	.....	.....	.....	.....	.....	AB A-1609	.....	Ball	Ball	.....	.....	24
25	Nash-Ambassador 6.....4160	.....	AL MZ-40-A	AL MAB-49-A	SAE 203	SAE 203	.....	AB A-899-2	7207G	14 rol. 2.181x.531	7207	.864x1x1$\frac{1}{16}$	.864x1x1$\frac{1}{32}$	25
26	Nash-Ambassador 8.....4180	.....	AL MZ-40-A	AL MAB-49-A	SAE 203	SAE 203	.....	AB A-899-2	7207G	14 rol. 2.181x.531	ND 7207	.864x1x1$\frac{1}{16}$	.864x1x1$\frac{1}{32}$	26
27	Oldsmobile-Special 6.....	ND 885140A	PI $\frac{5}{16}$x$\frac{1}{16}$	None	PI	ND 3203	Du 412562 (GM)	Gra 411538 (GM)	ND 47507	Rol 1294780 (GM)	ND 7506	Nb 1302154 (GM)	Bz 1307898 (GM)	27
28	Oldsmobile-Dynamic 6.....	ND 885140A	PI $\frac{5}{16}$x$\frac{1}{16}$	None	PI	ND 3203	Du 412562 (GM)	Gra 411538 (GM)	ND 47507	Rol 1294780 (GM)	ND 7506	Nb 1302154 (GM)	Bz 1307898 (GM)	28
29	Oldsmobile-Custom 6.....	ND 885140A	PI $\frac{5}{16}$x$\frac{1}{16}$	None	PI	ND 3203	Du 412562 (GM)	Gra 411538 (GM)	ND 47507	Rol 1294780 (GM)	ND 7506	Nb 1302154 (GM)	Bz 1307898 (GM)	29
30	Oldsmobile-Special 8.....	ND 885140A	PI $\frac{5}{16}$x$\frac{1}{16}$	None	PI	ND 3203	Du 412562 (GM)	Gra 411538 (GM)	ND 47507	Rol 1294780 (GM)	ND 7506	Nb 1302154 (GM)	Bz 1307898 (GM)	30
31	Oldsmobile-Dynamic 8.....	ND 885140A	PI $\frac{5}{16}$x$\frac{1}{16}$	None	PI	ND 3203	Du 412562 (GM)	Gra 411538 (GM)	ND 47507	Rol 1294780 (GM)	ND 7506	Nb 1302154 (GM)	Bz 1307898 (GM)	31
32	Oldsmobile-Custom 8.....	ND 885140A	PI $\frac{5}{16}$x$\frac{1}{16}$	None	PI	ND 3203	Du 412562 (GM)	Gra 411538 (GM)	ND 47507	Rol 1294780 (GM)	ND 7506	Nb 1302154 (GM)	Bz 1307898 (GM)	32
33	Packard-One Ten.....1900	MR 5200-FFS18	.....	.....	.....	.....	MR 7109	.....	MR 209-CFG	.....	MR 306-SG	.....	.....	33
34	Packard-One Twenty.....1901	MR 5200-FFS18	AL MZ-40-A	AL MG-77-A	AL GBF-79	SAE 203	MR 7109	.....	MR 209-CFG	.....	MR 306-SG	.....	.....	34
35	Packard-Super Eight.....1903-4-5	MR 5200-FFS18	AL MZ-40-A	AL (l)	AL GDF-79	SAE 203	MR 7109	.....	MR 209-CFG	.....	MR 306-SG	.....	.....	35
36	Packard-Cus. Sup. Eight.1906-7-8	MR 5200-FFS18	AL MZ-40-A	AL (l)	AL GBF-79	SAE 203	MR 7109	.....	MR 209-CFG	.....	MR 306-SG	.....	.....	36
37	Plymouth.....P-11	OL (a)	(b)	(c)	(m)	SAE 203	OL .753x.941x.875	AB A935-1 or BCA 4950-A	(h)	14 rollers. 2181x.5313	(g)	22 rollers .1249x.9305	22 rollers .1249x.9305	37
38	Plymouth-Special DeLuxe...P-12	OL (a)	(b)	(c)	(m)	SAE 203	OL .753x.941x.875	AB A935-1 or BCA 4950-A	(h)	14 rollers .2181x.5313	(g)	22 rollers .1249x.9305	22 rollers .1249x.9305	38
39	Pontiac-DeLuxe 6.....41-25	ND 885140A	CI .562x$\frac{31}{32}$	OB .500x.562x$\frac{25}{32}$	Du 812823 (GM)	ND 3203	ND 7109	Gra 1$\frac{1}{16}$x2$\frac{5}{8}$x$\frac{3}{4}$	ND 47507	Hy 1294780 (GM)	ND 7506	Nb 1302154 (GM)	Bz .850x.987x$\frac{3}{4}$	39
40	Pontiac-Streamliner 6.....41-26	ND 885140A	CI .562x$\frac{31}{32}$	OB .500x.562x$\frac{25}{32}$	Du 812823 (GM)	ND 3203	ND 7109	Gra 1$\frac{1}{16}$x2$\frac{5}{8}$x$\frac{3}{4}$	ND 47507	Hy 1294780 (GM)	ND 7506	Nb 1302154 (GM)	Bz .850x.980x$\frac{3}{4}$	40
41	Pontiac-Custom 6.....41-24	ND 885140A	CI .562x$\frac{31}{32}$	OB .500x.562x$\frac{25}{32}$	Du 812823 (GM)	ND 3203	ND 7109	Gra 1$\frac{1}{16}$x2$\frac{5}{8}$x$\frac{3}{4}$	ND 47507	Hy 1294780 (GM)	ND 7506	Nb 1302154 (GM)	Bz .850x.980x$\frac{3}{4}$	41
42	Pontiac-DeLuxe 8.....41-27	ND 885140A	CI .562x$\frac{31}{32}$	OB .540x.562x$\frac{25}{32}$	Du 812823 (GM)	ND 3203	ND 7109	Gra 1$\frac{1}{16}$x2$\frac{5}{8}$x$\frac{3}{4}$	ND 47507	Hy 1294780 (GM)	ND 7506	Nb 1302154 (GM)	Bz .850x.980x$\frac{3}{4}$	42
43	Pontiac-Streamliner 8.....41-28	ND 885140A	CI .562x$\frac{31}{32}$	OB .500x.562x$\frac{25}{32}$	Du 812823 (GM)	ND 3203	ND 7109	Gra 1$\frac{1}{16}$x2$\frac{5}{8}$x$\frac{3}{4}$	ND 47507	Hy 1294780 (GM)	ND 7506	Nb 1302154 (GM)	Bz .850x.980x$\frac{3}{4}$	43
44	Pontiac-Custom 8.....41-29	ND 885140A	CI .562x$\frac{31}{32}$	OB .500x.562x$\frac{25}{32}$	Du 812823 (GM)	ND 3203	ND 7109	Gra 1$\frac{1}{16}$x2$\frac{5}{8}$x$\frac{3}{4}$	ND 47507	Hy 1294780 (GM)	ND 7506	Nb 1302154 (GM)	Bz .850x.980x$\frac{3}{4}$	44
45	Studebaker-Champion.....3G	MR 5200-FFS13	AL MZ-40-A	AL MAB-124	AL GBF-79	SAE 203	BC $\frac{5}{8}$x$\frac{13}{16}$x$\frac{3}{4}$	BCA 4768-A	MR 207-SFG	Ban C-1110-Q	MR 206-SFG	Cle $\frac{5}{8}$x$\frac{3}{4}$x1$\frac{1}{4}$	Cle $\frac{5}{8}$x$\frac{3}{4}$x1$\frac{1}{4}$	45
46	Studebaker-Commander 6...11A	BC $\frac{1}{2}$x1x1$\frac{1}{4}$	AL MZ-40-A	.....	AL-GBF-79	SAE 203	$\frac{3}{4}$x$\frac{13}{16}$x$\frac{7}{8}$	AB A-899-2	MR 207-SG	WG 14 rol. $\frac{3}{32}$x$\frac{17}{32}$	MR 207-S	Ban C-407-Q	SSb $\frac{3}{4}$x.887x1$\frac{1}{11}$	46
47	Studebaker-President 8.....7C	NM	AL MZ-40-A	.....	AL GBF-79	SAE 203	Hy RA-133	BCA 4959A	MR 207-SFG	WG 14 rol. $\frac{3}{32}$x$\frac{1}{32}$	MR 207-S	Ban C-407-Q	Bz $\frac{3}{4}$x.887x1$\frac{1}{16}$	47
48	Willys-Americar.....441	NM (k)	AL MZ-40-A	AL MG-77-A	AL GBF-79	SAE 203	Bu	AB A-935-1	MR 207-SFG	Hy RA-9321B	MR 305-SFG	Bu	Bu	48

ABBREVIATIONS:

(a)—Front .596x1.128x1.406
Rear .671x.879x.938
(b)—Oilite .627x.755x.968 or Auto-Lite GBF-79
(c)—Oilite .501x.627x.735 or Auto-Lite MP-41-A
(d)—Fluid coupling hub bearing MR 207-SF or SKF 466054. Runner Inner, Front, Tor. B-1212-x; Rear, Tor. B-1612-x.
(e)—MR 207-MFG or SKF I-70822-R
(f)—MR TF-7-1 or SKF-465679-R
(g)—MR 207-S, SKF-I-71658-B, WG X-3204 or WG X-3204-A
(h)—MR 207-SFG or SKF-465679
(k)—New Departure 885141 or MR D2-13567
(l)—MAW-77 Armature shaft, MG-77A on clutch shaft
(m)—OL .627x.755x.968 or Auto-Lite GBF-79
AB—Aetna Ball Bearing Mfg. Co.
AL—Electric Auto-Lite Co. **An**—Annular
Ban—Bantam Bearing Co.
BB—Ball bearings
BCA—Bearings Co. of America, Inc.
BC—Bound Brook Company
Bu—Bushing **Bz**—Bronze
CI—Cast Iron
Cle—Clevite—Cleveland Graphite Bronze Co.
Du—Dures—Moraine Products Div.
Fed—Federal Bearing Co.
GM—General Motors' number
Gra—Graphite ring
Hy—Hyatt Bearing Division
MR—Marlin-Rockwell Corp.
Nb—Needle bearing
ND—New Departure Division
NM—New Departure or Marlin Rockwell
OB—Oilless bushing
OL—Oilite—Chrysler Corp.
Pl—Plain
Rol—Roller
SAE—Society of Automotive Engineers' number
Sb—Split bronze
SSb—Steel backed babbitt
WG—Warner Gear Div.

Industrial Application of Gasoline Engines

(*Continued from page* 433)

a speed of 25 m.p.h., and those of tires for machines to be hauled by crawler tractors on a speed of 10 m.p.h. Average speeds in this work, however, are much lower, as indicated by the fact brought out by the author, that the life of tires in construction work is estimated at 3000 hours or 12,000 miles, which makes the average speed 4 m.p.h.

In addition to dealing with items of design, the author also went into the matter of operating cost in considerable detail, and gave figures for both gasoline-engined and Diesel-engined earth-moving trucks. It was pointed out that in construction work costs are figured on the hourly basis, in contrast to practice in highway haulage, where it is based on the mile or ton-mile. For a 15-ton dump truck the author gave a cost figure of $4.27 per hour for a gasoline-engined machine and $3.95 per hour for a Diesel-engined machine. The difference, of course, is due mainly to the lower consumption of the Diesel engine and the lower cost of Diesel fuel, the fuel costs for the two types of machine being figured at 69 cents and 23 cents per hour, respectively. The possibility of a lower total operating cost with Diesel engines seems to be generally recognized by operators, and most of the machines of which slides were shown were Diesel-equipped.

Tire cost, of course, is an important item. In the estimate of operating costs it was set down at 50 cents per hour for the 15-ton dump truck, but it was stated that in certain work, such as levee construction, the wear and tear on tires is considerably less, and the hourly cost may be as low as 30 cents.

Whereas highway trucks are generally equipped with dual tires on the driving wheels, the type of truck discussed by Mr. Church is provided with single wheels of large diameter. One reason for this is that the rolling resistance is somewhat smaller with wheels of large diameter. This applies particularly to turns, where, owing to the greater width of road contact with dual tires, the amount of sliding is greater. Another thing against the use of dual tires is that on rough surfaces the total load is frequently taken by a single tire, which is then over-stressed. Finally, in wet weather dirt will often pack in between dual tires, or rocks will wedge in between them.

In connection with the cost estimate, some figures were given regarding the cost and life of the tires used. For instance, the 15-ton rear dump truck in a rough rock-carrying job carries 13.50 x 24-in., 18-ply tires. A tire and tube of this size, with a load capacity of 10,700 lb., cost $1,483 and have an estimated life of 2000 hours, making the hourly tire cost 74 cents. For levee construction work the same truck is equipped with 24 x 32-in., 36-ply tires, with a load capacity of 31,200 lb. each. Tire and tube cost $2,270 and have an estimated life of 7500 hours, making the hourly cost 30 cents. It was brought out by a tire man present that the largest tire built to date, of 36 x 40 in. dimensions, costs $3,100. A touch of humor was introduced into the discussion at this point by one speaker who said that when he called up a rubber company to get the list price of a certain size of giant tire, the man at the other end of the wire had some difficulty in laying his hand on the information and finally disposed of the subject by remarking "anyhow, we never sell at list prices."

Trucks for use in construction work are expected to be capable of both high speed and extreme pulling power, and to make this wide range possible, some of them are equipped with transmissions with as many as eight speeds. It was pointed out in this connection that the installation of fluid couplings might make it possible to get satisfactory results with transmissions of fewer speed changes. A good many of the trucks,

Building the Sepulveda Dam in California with automotive equipment.

especially in levee construction, are operated by low-class labor, and their full possibilities are not realized. For instance, if a truck has two speed ranges with a total of eight different speeds, the driver is likely to set his transmission for one range and do all his driving in that range, regardless of performance or economy.

As regards powering of trucks for this work, Mr. Church said it was customary to allow between 4 and 5 hp. per ton of gross weight. In making calculations, the truck designer does not take the engine builder's rated power, but allows 10 per cent for driving accessories, 8 to 12 per cent for loss in transmission, and a small percentage for sub-normal atmospheric conditions and other variables, the power available at the tires being usually taken at about 75 per cent of the engine manufacturer's rating.

Caterpillar Diesel tractor and LeTourneau rooter ripping gray shale overburden from coal vein in strip mine near Fayette, Mo.

Equipment used in industrial operations such as mining usually receives much better maintenance than equipment in use by contractors.

In concluding his talk, Mr. Church said there is an unmistakable trend toward the use of heavy automotive haulage equipment in both public-works construction and in industrial work. While present equipment gives satisfactory service, it is not perfect, and improvements are constantly being made.

A paper read by F. A. Nikirk, a civil engineer connected with the Caterpillar Tractor Company, on "Earth-Moving Equipment and the Engineer," was of a philosophic rather than a technical character. Referring to the difficulties of the engineering problems presented by this type of equipment, Mr. Nikirk said:

Earth-Moving Equipment

"In earth moving, torque and shock take precedence over horsepower and speed. This brings increased demands upon gears, transmissions and bearings as well as frames and other structural members. Earth must be moved up hill or down dale as the case may be, over rough and rocky ground, through swamps and mud or over the abrasive sands of the desert. Furthermore, construction equipment must be capable of continuous operation at full load for indefinite periods of time, in freezing weather or in the intense heat of a tropical sun. It must continue to work under conditions where dust and mud would ruin other types of machinery in a few short hours. And last but not least, it is generally operated by a type of labor that is capable of inflicting an unusual amount of abuse upon it."

During the past ten years, said Mr. Nikirk, new standards have been adopted to build safety into the roads and to reduce maintenance costs. Improvements in construction standards to provide better grades and longer sight distances have greatly increased the length of haul required in earth moving. In spite of these increased demands the price bid for excavation on Federal-aid highways throughout the United States in 1939 was 44.4 per cent below what it was in 1929, and 55.4 per cent below the price bid in 1923. At the same time the average price paid for common labor in 1939 was 22.5 per cent over that paid in 1929 and 31.8 per cent above the average price for 1923. With declining bid prices the contractor was forced to move more earth to maintain a reasonable profit. With modern methods and equipment it is possible to maintain production rates in earth moving that are five or six times as great as was possible in the days when manual labor and animal power were used. This speed in construction, as well as economy, is of unlimited value to our country in these days when preparedness is a vital issue. The mechanical engineer and the manufacturer can rightfully claim a large share of credit for rendering both speed and economy in construction possible.

Hydraulic Drives

The two papers on hydraulic-drive units were by N. L. Alison, general manager, Hydraulic-Coupling Division, American Blower Corporation, and R. M. Schaefer, general manager, Hydraulic Department, Twin Disc Clutch Company. They dealt with the hydraulic transmission units developed by these companies, which have been previously described and illustrated in these columns. They also contained some interesting information regarding the historical development of these units. While the application of hydraulic drive units to motor vehicles and power equipment in this country dates back only a few years, the original development of such apparatus for marine installation occurred during the early years of the current century. It appears, moreover, that the hydraulic torque converter preceded the hydraulic coupling. As brought out in Mr. Alison's paper, the forerunner of the various present types of hydraulic transmission units was the Foettinger speed transformer, which was invented shortly after the introduction of the steam turbine for marine propulsion. This was

before the days of helical reduction gearing for high-speed steam turbines, and the Foettinger transformer came into extensive use for connecting a high-speed marine turbine to a low-speed propeller. A reduction ratio of about 5:1 could be obtained with this converter, and with the driven shaft stalled the torque was multiplied in practically the inverse proportion.

The advent of the high-speed geared Diesel engine for marine propulsion made necessary some sort of vibration damper between the engine crankshaft and the pinion gear to protect the gears from the severe torsionals inherent in the early designs of Diesel engines. This, however, was not a question of speed or torque conversion, and as a result the stationary reaction member of the Foettinger transformer was eliminated and a simple coupling, having a one-to-one torque ratio resulted.

Such a coupling was developed by Dr. Bauer, and has become known as the "Vulcan coupling," having been produced in the Vulcan plant in Hamburg. Since that time, more than 2,000,000 hp. have been installed in commercial and naval vessels.

Mr. Schaefer in his paper gave a sort of "family tree" of hydraulic transmission units. This showed that all development in this line derived from the original work of Doctor Foettinger in Germany, which was taken up by Harold Sinclair in England and by the Ljungstrom Works in Sweden. Sinclair developed the hydraulic coupling as originally used on Daimler automobiles in England, while the Ljungstrom Works originated the Lysholm-Smith hydraulic transmission. The original Foettinger patents have expired, but some of the American companies now in the hydraulic-drive-unit field are operating under the Sinclair and Ljungstrom patents.

Power Farming and National Security

A paper on "The Contributions of Power Farming to National Security" was read by Dale Cox, director of public relations, International Harvester Company. After explaining that by "power farming" is meant that part of agricultural activities which depends on the internal combustion engine rather than on animal power, Mr. Cox traced the inter-relations between national defense and agricultural practices in an interesting manner. In war times a large part of the man-power is withdrawn from the farms, because it is needed for military operations. At the same time the demand for foodstuffs rises, because a soldier under war conditions, consumes about 50 per cent more food than a civilian. To emphasize the importance of plentiful food supplies from the standpoint of national defense, the author cited Napoleon's aphorism that "an army fights on its stomach," and the World War slogan that "food will win the war."

The introduction of agricultural machinery had its effects on the outcome of the Civil War. The reaper and steel plow had just come into use when that war started. In 1862 the Federal Commissioner of Agriculture said it would have been impossible to harvest the wheat crop that year had it not been for the reapers in use in the West. It was figured that each reaper working in the fields released five men for service in the Northern Army.

Although farm tractors had been in use to a small extent previously, the World War gave a powerful impetus to their development and use. In 1916 only 29,670 tractors were produced in the U. S. In 1917 the output doubled, attaining 62,742. In 1918 it doubled again, the production reaching 132,697. There was a further increase, to 164,590 in 1919, and in 1920 a peak of a little over 200,000 was reached, which was not equalled again until the boom year 1929. Output of all other farm implements also rose sharply during the war period, the value of farm machinery sold in the U. S. rising from $238,000,000 in 1916 to $643,000,000 in 1920. During that period the importance of the farm-equipment industry was officially recognized by the Federal Government, which declared it an "indirect war industry."

Aside from the decrease in the available man-power and the increased demand for foodstuffs, another factor that stimulated the demand for farm tractors was the use of draft animals by the Army. About 500,000 horses and mules were removed from the farms in the U. S. in one year and taken into our own military services and those of the Allies. The number of horses and mules on the farms has decreased ever since, from about 26,000,000 to about 15,000,000.

At the present time, the author said, our agriculture is much more efficient than it was 20 years ago. Certain farm machines which were just being introduced then, have been greatly improved and perfected, and are available in enormously increased numbers on our farms. The tractor, the combine, and the corn picker, all brought into wide use since the last war, are labor-saving machines and permit a great new segment of farm labor to go into other services if needed. There are now more than 1,500,000 tractors on the farms, as compared with a few hundred thousand during the World War. If the need arose, the women and boys could do most of the farm work with tractor power.

The crawler-type tractor has many uses in military operations, such as pulling field artillery pieces, building emergency airports and military roads, leveling off airports damaged by bombs, etc. One development that would add greatly to the effectiveness of wheeled tractors in a period of emergency is the adoption of rubber tires. Rubber-tired farm tractors were entirely unknown in 1917-1919, while today they constitute 80-90 per cent of the entire tractor output. There has been marked improvement also in the fuel economy of farm tractors, and Nebraska tractor-test results cited by the author showed that whereas 65 tractors tested in 1920 developed an average of 7.52 b.hp.-hr. per gal. of fuel consumed, an equal number tested in 1938 showed an average performance of 10.14 b.hp.-hr. per gal.

Our Defense Program

At the dinner held on Tuesday evening, J. M. Davies of the Caterpillar Tractor Company acted as chairman and C. E. Frudden, executive engineer of Allis-Chalmers Manufacturing Company, as toastmaster. The principal address was made by A. W. S. Herrington, president of the Marmon-Herrington Company, and dealt with "Our Defense Program and What Comes Afterward."

Dodge

de Luxe and Custom Series enter 1941 season with new gear-shifting mechanism

FOR 1941 Dodge offers two model series of "Luxury Liners," the DeLuxe Series and the Custom Series. It it said that price comparisons with the DeLuxe line of 1940 can be properly made only by using the prices of the 1941 DeLuxe Series. Price increases have been made ranging between 1.1 and 2.1 per cent and averaging 1.6 per cent. Prices of all of the new cars are listed in the following table and for the sake of comparison the prices of the corresponding 1940 models are given alongside those of 1941 models:

Dodge Detroit-Delivered Prices Including Federal Taxes

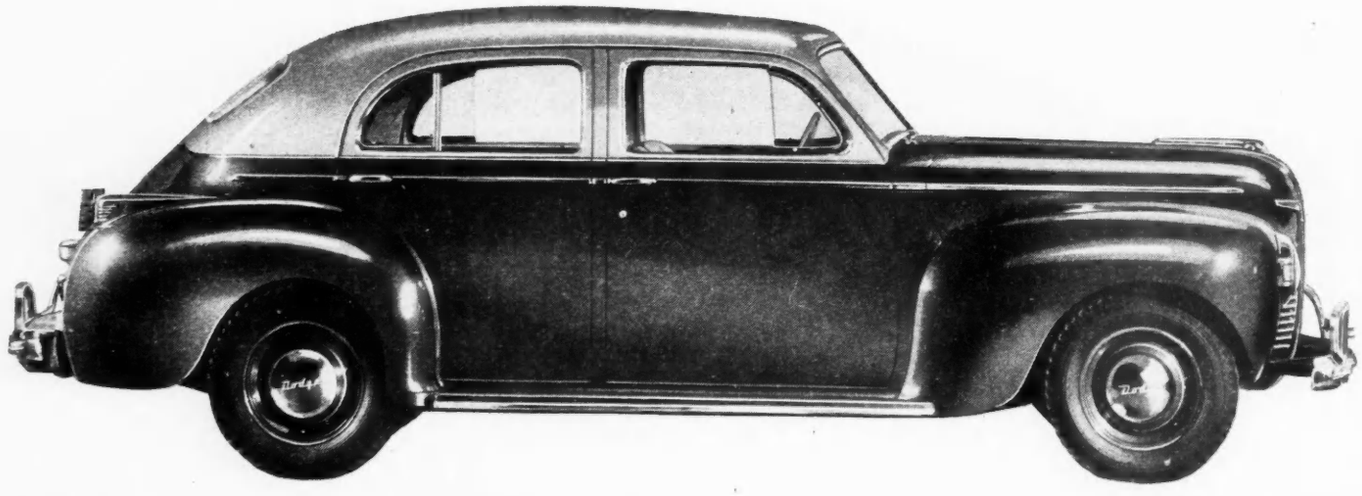
	1941	1940
DeLuxe coupe	$825	$808
DeLuxe two-door sedan	880	865
DeLuxe four-door sedan	920	910
Custom two-door brougham	925	
Custom six-passenger coupe	960	
Custom four-door sedan	965	
Custom town sedan	995	

The prices given are for cars with or without running boards and include bumpers, bumper guards, safety-type wheels, spare wheel and tire, two tail lights, safety glass in all windows, deluxe-type steering wheels, fenders and sheet metal finished to harmonize with a variety of new body colors. The Custom Series prices also include "Air-Foam" seat cushions.

Detail improvements have been made in practically every part of the car. Hydraulic couplings this year will be available on all of the seven models. Bodies have been redesigned; they are wider, longer and lower, but their head room has not been decreased.

The chassis frame, formerly an X-type, now is of the closed-in, box-section type, which change permitted further lowering of the body and affords greater rigidity. With the exception of the seven-passenger sedan and limousine models, which have a wheelbase of 137½ in., all bodies are mounted on a chassis of 119½ in. wheelbase. Other improvements include an increase in engine power, adoption of the oil-bath, heavy-duty type of air cleaner as standard equipment, two-fold fuel filtering, a new gear-shifting mechanism mounted at the side of the transmission and reducing the shifting movement to 4 in., and a higher second-speed transmission ratio, 1.83 instead of 1.55, to facilitate starting in second gear. Rear-spring leaves now are of the grooved cross-section type, which is said to lower spring stresses. Rubber-insulated shackles are used at the rear end of the rear springs. Front-suspension members have been strengthened. The battery now has a ventilating manifold and is located under the hood. The pitman arm of the steering gear has a rubber-insulated joint. There is a new design of master cylinder in the hydraulic-brake system. Rear wheels are of the new safety type which does not throw the tire in the event of a puncture or blow-out.

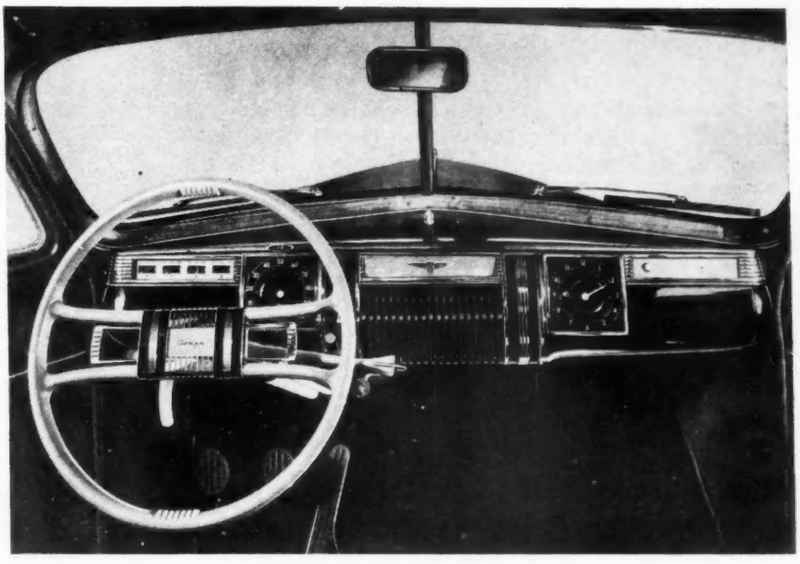
Front seats of the 1941 Dodge are 55 in. wide. The single-pane rear windows of the sedan, brougham and seven-passenger models are 2 7/16 in. higher and 7¾ in. wider, which increases their area by 47 per cent. Luggage compartment lids have smooth, rounded-off corners for safety, and are spring-balanced. The compartment is fully illuminated. Interior door handles point straight downward and are pulled toward the occupants to open the door, hence the doors cannot be opened inadvertently by leaning against the handles. Hoods can be unlocked only from inside the driving compartment, so that when the doors are locked, the accessories under the hood are protected.



The fan-cooled, two-brush, shunt-type generator of 35-amperes output capacity features a new armature insulation. Voltage control is automatic. The coil and distributor are located closer together and the high-tension cables have improved weather protection.

The lighting system is of the sealed-beam type, with headlamps flush-mounted in the front fenders as integral parts of the grille. Fender-mounted flashing front and rear directional indicators are available as special equipment.

The Fluid Drive is offered in the Coupe, two-door Sedan and four-door Sedan of the Dodge 1941 DeLuxe series—and in a six-passenger Coupe, two-door Brougham, four-door Sedan and a Town Sedan of the Custom series. While all cars in the Dodge line remain equipped with a transmission giving the three conventional geared speeds, the Fluid Drive provides, in addition, an almost limitless number of fluid-controlled in-between car speeds that call for no attention on the part of the driver.



The new steering wheel has two parallel spokes. The speedometer, seen behind the wheel, is of the Safety Signal type.

Head-on view of the 1941 Dodge Luxury Liner. The stone shield and bumper guards shown are special equipment.

Dodge Luxury Liner four-door Town Sedan with two-tone finish.

There are only two working parts in the Fluid Drive employed by Dodge. One is the driving member or "Impeller" which is fastened to the engine crankshaft where it takes the place of the conventional flywheel. The other is the driven member or "Runner" which is fastened to the drive shaft of the car. Both driver and runner are made of pressed steel, with a series of fins or vanes dividing the parts into cells. The driver contains 32 of these cells, the runner 30. When the shell-like driver and the runner are assembled they are set face to face with a slight space between them and enclosed in a sealed steel housing which contains two gallons of oil. In action, the driving member rotating with the crankshaft operates as a centrifugal pump whose vanes throw oil against the vanes and into the cells of the driven member that propels the car.

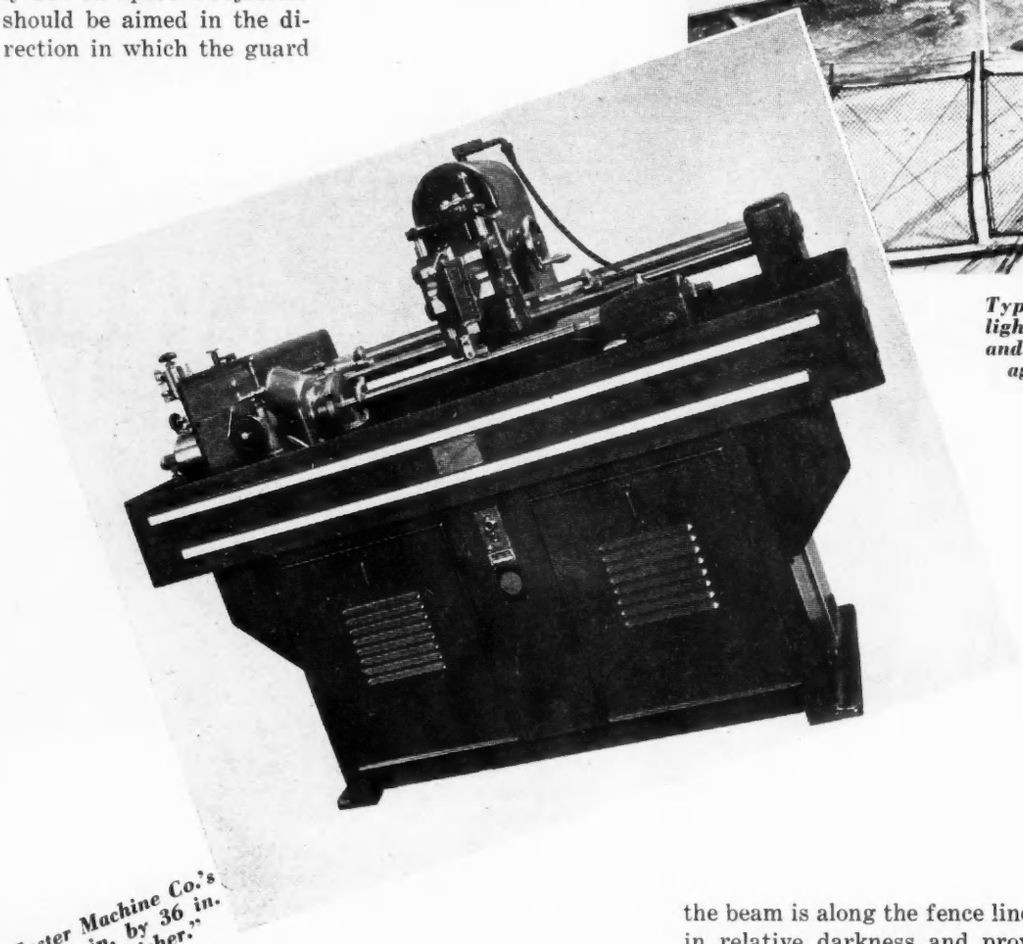
When the speed of the car is such that the driving and the driven members turn at approximately the same speed, the oil filling the steel housing will travel with both sets of vanes, the flow of oil being sufficient to provide a cushion in the drive. However, when driving conditions reach the point where the driven unit tends to turn at a slower speed than the driving unit, the oil flows past and around the vanes.

(*Turn to page* 467, *please*)

By H. E. Blank, Jr.

Timely information on the technique of floodlighting factory grounds and buildings at night as a means of protecting defense production facilities against possible depredations of sabotage was issued recently by the Benjamin Electric Mfg. Co., Des Plaines, Ill. In its discussion of some of the fundamental principles of floodlighting the company recommends particularly that fences should be lighted adequately, pointing out that this will not only reduce the number of guards required but also will simplify patrolling. The conventional method of lighting a fence line is to place a narrow beam 1000-watt floodlighting projector at each corner and to place additional projectors approximately 300 ft. apart. Projectors should be aimed in the direction in which the guard is patrolling, so that the light does not shine in his eyes.

Typical example of floodlighting factory buildings and grounds as a protection against possible sabotage.

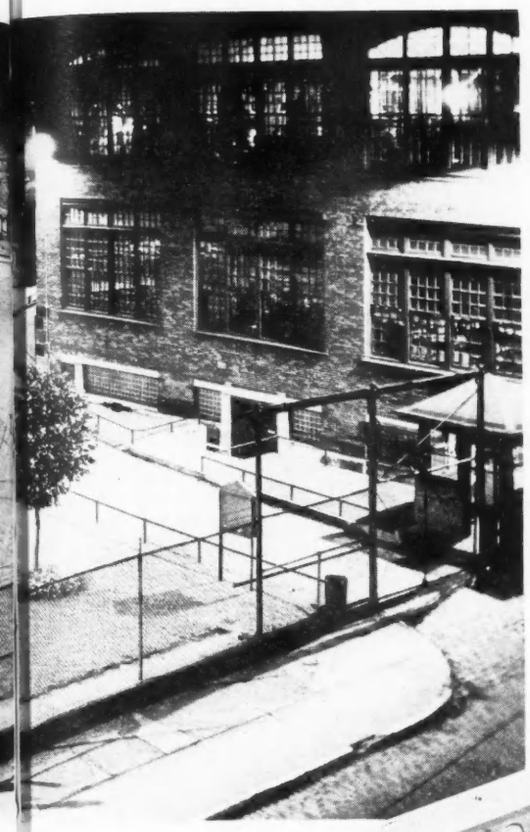


Foster Machine Co.'s new 4 in. by 36 in. "Superfinisher."

Local conditions, such as the type of fence, the location of guards, method of patrolling, size of the yard, location of buildings and surroundings of the yard may make a different system of lighting more effective. For instance, if buildings are close to a fence line it may be desirable to place the floodlighting projectors on the roofs of adjacent buildings and to light the area up to as well as beyond the fence. If there is a wire fence and the guard is patrolling inside the fence, it may be desirable to use a wider beam projector and direct most of the light outside of the fence so that the edge of the beam is along the fence line. This leaves the guard in relative darkness and provides a wide space outside of the fence for observation. If the fence is opaque, it should be painted white. In other places as well it often is possible to lighten backgrounds which help guards to detect an intruder.

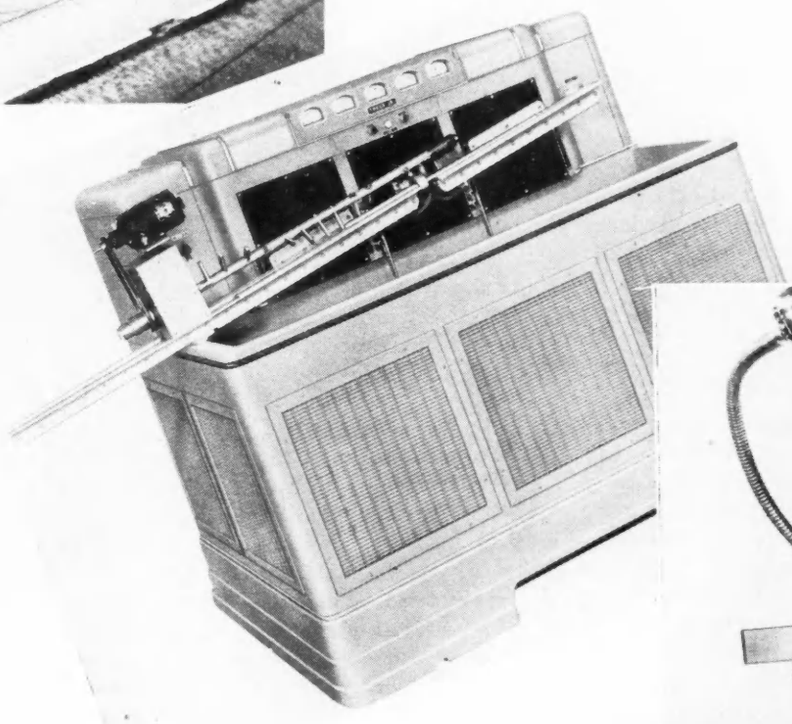
Sometimes it is feasible to light a fence line by means of local units spaced 50 to 75 ft. apart. These units should be mounted high enough so that a person cannot reach up and strike the lamp with a club, putting a section in darkness. It is necessary to place units sufficiently close together so that there is no large section in darkness if one lamp is broken or burned out. Close spacing also is desirable to provide the coverage necessary in fog and bad weather.

MEN and MACHINES

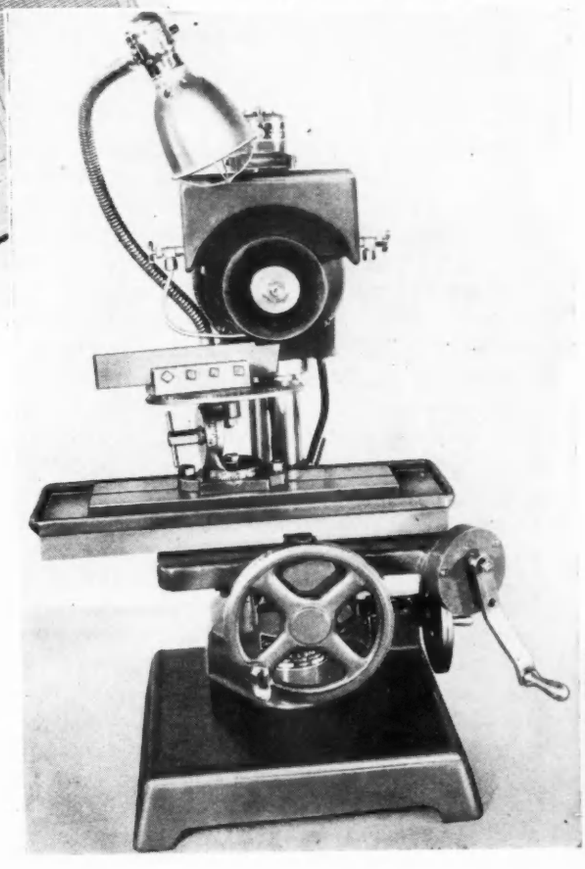


(Below) The Ohio Crankshaft Co.'s standard Tocco Junior induction hardening unit typical auxiliary attachment. This attachment has been designed for rocker arm shafts.

AMONG the new items of equipment announced recently, one of the most interesting is the Tocco Jr. induction hardening unit offered by the Ohio Crankshaft Co., Cleveland, Ohio. It is similar to the large Tocco units except that the equipment has been arranged in a single package which can be placed in the production line. The photograph reproduced herewith shows a three-station machine, Type MG 10. On a single station unit, the two outside stations



(Below) Equipment for grinding chip-breakers in carbide tools, built by Carboloy Co., Inc.



There are many vulnerable areas around a property which should receive careful study to provide satisfactory lighting, such as: Space along railroad tracks and highways; narrow alleys between buildings; narrow spaces between buildings and fence lines; all entrances to yards; entrances to important buildings; areas where there is concealment, such as shrubbery or outbuildings; near to the fence line; and, streets that dead end at the property line.

are fitted with blank steel panels. On a two-station unit, the center station is fitted with a blank panel.

The new Tocco Jr. unit is furnished complete, including: A motor generator set for the supply of 9600 cycle high frequency current to the induction heating device; an instrument panel with instruments which indicate all the control factors; high frequency current from the generator is transformed with an iron core water-cooled transformer for the supply to the inductor block. (Connected to this transformer is a bank of water-cooled high frequency condensers with selector switches for power factor adjustment of the high-frequency current in order to obtain the maximum heating effect in the part being heated and to operate the generator at its maximum efficiency); a high frequency circuit breaker which is the main switch between the generator and the inductor; automatic Tocco cycle control. A push button starts the control which is driven by a synchronous motor. The circuit breaker is closed and held closed for a predetermined duration of time; then the electrically operated quench valve is opened and held open for the predetermined duration of time to produce an exact hardening cycle controlled within a small fraction of a second.

The unit measures 79¼ in. in width, 64 11/16 in. in height and 59 in. in depth.

CARBOLOY CO., INC., Detroit, has brought out a machine for grinding chip-breakers in carbide tools. In most steel machining operations where cemented carbides are used, chip-breakers of some form or another are essential due, first, to the necessity of clearing chips from the work and, secondly, to the increase in chip production. The first is important from the standpoint of chip clearance in machine tools, while the latter is vital from the standpoint of operator safety—especially with chips coming off the work at speeds up to 400 f.p.m. or more.

Exact forms of chip-breakers determined as ideal for any given operation can be duplicated when the tool is re-ground on the new machine. For this purpose the tool is clamped in a tool holder mounted on a universally adjustable fixture table fitted with three protractors to permit adjusting to correct setting in all directions. The tool then is moved under the wheel to a distance corresponding to the chip-breaker width desired and the wheel is fed down while the table moves back and forth. The wheel feed also is provided with graduations so that chip-breakers can be ground to the exact depth desired.

Resinoid diamond wheels of 100 grit are recommended for use on the Carboloy chip-breaker grinder. Coolants recommended in order of efficiency in keeping the wheel open, include: Stadoil, water with just enough soluble oil added to prevent rusting, and kerosene.

The grinder is designed for use with tools up to 1¼ in. wide.

Machine Tool Industry Operating Rate

Operating capacity of the machine tool industry during August, according to the National Machine Tool Builders' Association, stood at 93.3 per cent of capacity as compared with 88.3 per cent for July, 1940. The Association points out that the industry's capacity, measured in terms of payroll hours continues to increase, the indication at the end of the month being 35.0 per cent above September, 1939.

FOSTER MACHINE CO., Elkhart, Ind., has announced a new 4 in. by 36 in. Superfinisher which is intended for work that is larger than can be accommodated on its general purpose Superfinisher. The new machine will handle the larger size guide bars of die sets, piloted boring bars, and almost any cylindrical work up to four inches in diameter and 36 in. in length. A machine also can be built to accommodate work approximately 50 in. between centers.

The new unit is designed for collet, chuck or center work, and may be provided with centerless or flat surface attachments. Among the features of design is a mechanical drive to the traverse which also has a hand adjustment for positioning. The spindle is driven by a Graham transmission with a stepless range of speeds from 0 to 500 r.p.m. This machine has a quick stone retraction device, and standard single and double stone holders are available. Bars carrying the Superfinishing head are horizontally parallel, thereby reducing the overall height of the machine. A positive stop for the Superfinishing head may be used to position the head accurately in relation to surface when the traverse is not used.

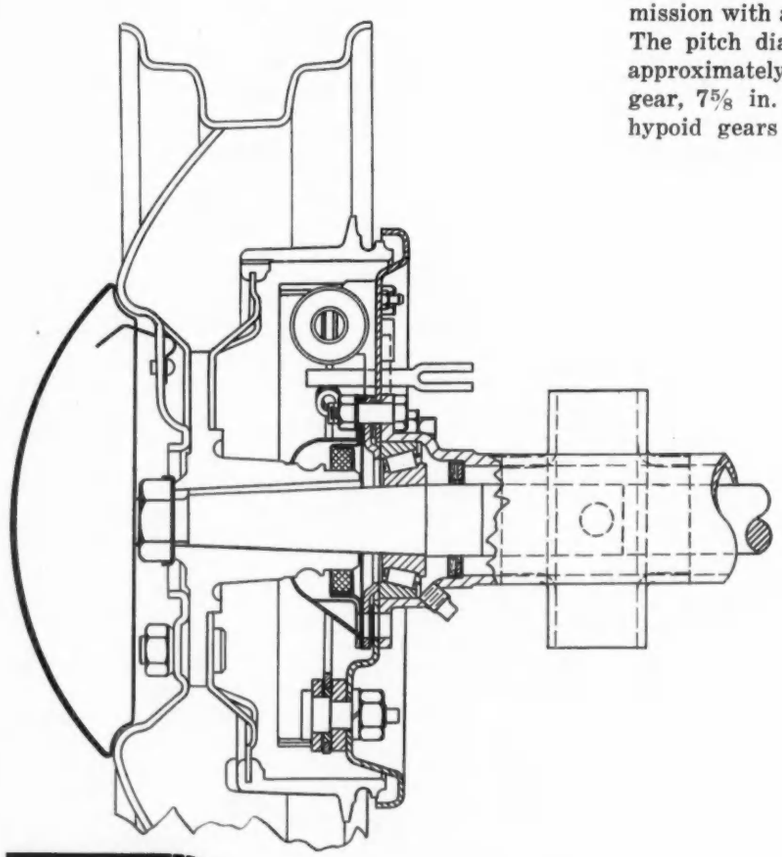
TOWMOTOR CO., Cleveland, Ohio, has produced a new lift truck, the LT-40, for handling 1000 to 3000 lb. loads. Built on a 40-in. wheelbase, with a turning radius of 68 in., the truck has an overall width of 35 in. and an overall length (without forks) of 70 in. Interchangeable attachments—forks, rams, scoops, flat plates and loading devices—adapt the unit for handling a wide variety of materials.

Powered by a 22 hp. four-cylinder gas engine, equipped with degasser and governor, the LT-40 is said to travel at speeds from one to 10 mp.h.—with two speeds forward and two reverse, achieved by a transmission having only four gear elements. The manufacturer also claims that the unit will lift and stack its rated load accurately to heights of seven, nine and 11 feet—at the rate of approximately 40 f.p.m.

A NEW line of "Vertiflow" unit heaters designed particularly for buildings having high ceilings has been announced by the Young Radiator Co., Racine, Wis. The line includes 12 sizes varying in capacities from 63,000 to 480,000 B.t.u./hr. These units may be installed high above the floor close to the ceiling, thereby eliminating any possibility of air stratification.

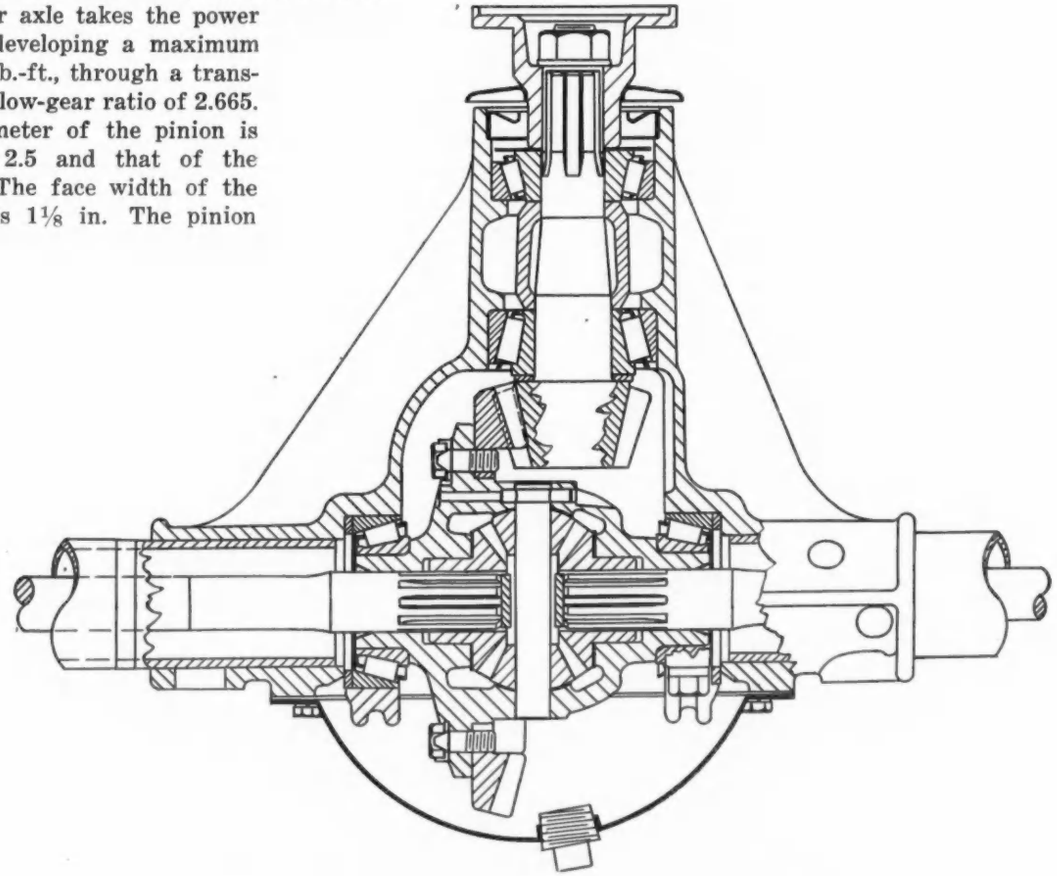
WILLYS HYPOID-GEAR-DRIVEN REAR AXLE

The Willys car this year is equipped with a new rear axle with a hypoid-gear final drive. Sections through the center housing and the axle end with wheel hub and brake are shown on this page, while on the following page are shown side views of the wheel and brake and of the center housing.



Horizontal section through final-drive-gear housing and axle end

It will be seen from the drawing that the axle is of the semi-floating type. With the tires inflated the road clearance under the center housing is 8 in. The hypoid-gear pinion has 9 teeth and the gear 40, which makes the reduction ratio 4.44. This rear axle takes the power of an engine developing a maximum torque of 108 lb.-ft., through a transmission with a low-gear ratio of 2.665. The pitch diameter of the pinion is approximately 2.5 and that of the gear, 7⅝ in. The face width of the hypoid gears is 1⅛ in. The pinion



DESIGN

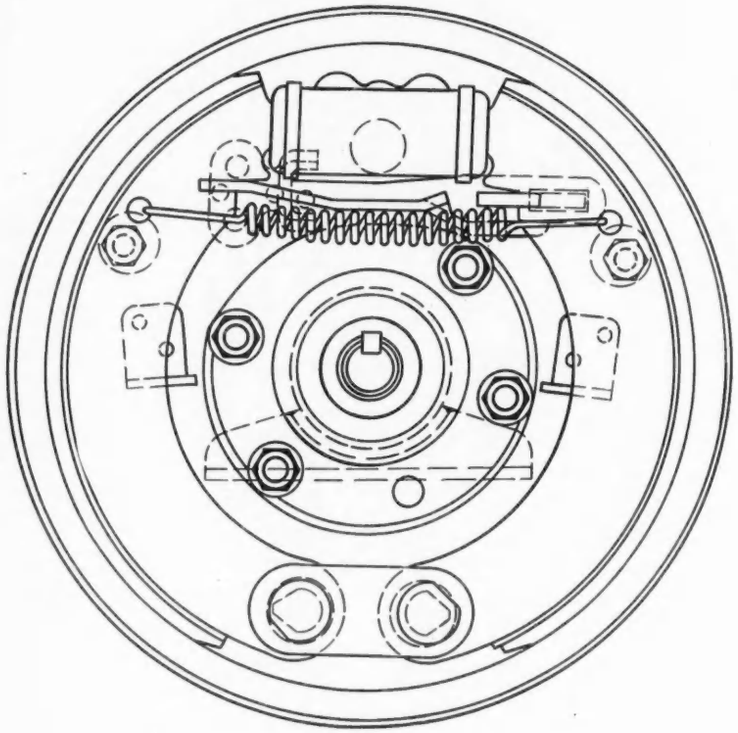
WILLYS HYPOID-GEAR-DRIVEN REAR AXLE

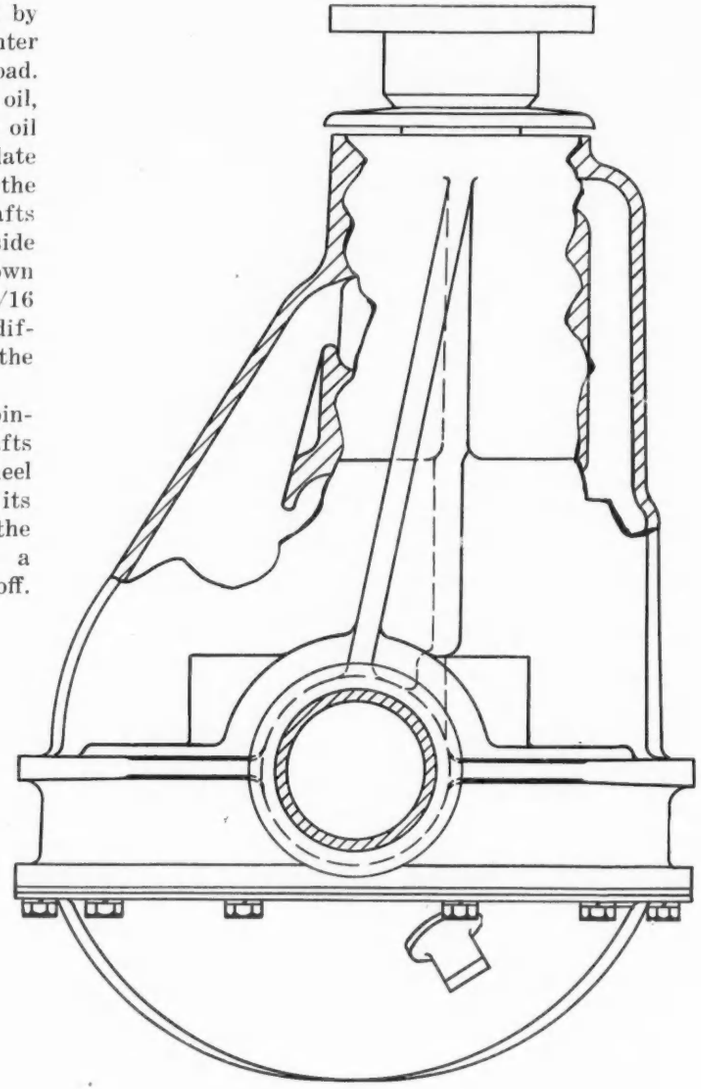
shaft is carried in two taper roller bearings and is adjusted axially by means of shims. The pinion is integral with its shaft, to which a universal-joint companion flange is secured by means of splines.

The differential gear is of the two-pinion type. Its side gears connect to the axle shafts by means of splined joints. All bearings in the rear axle are of the Timken roller type and are preloaded, the preload being obtained by means of shims.

The axle housing is of the built-up type, consisting of a malleable cast-iron center housing into which the steel axle tubes are secured by riveting. Liberal ribs and flanges on the center housing minimize deflections under gear load. Lubrication of the axle is by transmission oil, viscosity grade 90 being recommended. The oil capacity is 2 pints. A pressed-steel cover plate containing an inspection plug is secured to the center housing by ten cap screws. Axle shafts have a maximum diameter of 1¼ in. just inside the wheel bearings, and taper down to a minimum diameter of 15/16 in. adjacent to the upset splined differential end. At the splines the diameter is 1 1/16 in.

Oil seals are provided on the pinion shaft and on the axle shafts both inside and outside the wheel bearings. Any oil that may find its way past the oil seal outside the wheel bearing is caught in a pressed-steel guard and drained off.





Side views of wheel and brake (left) and of center housing (right)

NEWS OF THE INDUSTRY

Continental Motors Corp. Will Build Tank Engines

Powerplants Are Intended For Use In 25-Ton Tanks Which Chrysler Has Contracted To Make For U. S.

Continental Motors Corp. has reopened its Detroit plant after a year's idleness and will begin manufacture there within six months of tank engines to power the 25-ton tanks which Chrysler Corp. has contracted to make for the U. S. Government in its new tank arsenal now under construction. The Detroit plant of Continental had been closed since October, 1939, when the company moved its operations to Muskegon.

Retooling of the Detroit plant is expected to be completed by next April 1. The plant, which contains 500,000 sq. ft. of floor space, will employ 3000 to 5000 men. When the company moved to Muskegon, a bid of $574,000 for the Detroit plant was turned down.

It is understood that Continental has a large order for tank engines for the British government, but this cannot be confirmed. National Defense orders to Continental from the U. S. Government totaled $26,710,332 as of Oct. 1. Of this sum, $7,260,711 was for aircraft engines and $19,449,621 for tank engines. All but $1,090,894 of these orders have gone to the Muskegon plant, which now employs 2500 workers.

Continental manufactures the W-670 engine, which is adaptable to either aircraft or tank use. This is a seven-cylinder radial type engine which develops 225 to 250 h.p. The engines are used in army and navy training planes and in medium tanks. Continental also makes tractor, industrial and light airplane engines and parts at its Muskegon plant, sales totaling $7,250,000 in that field last year.

The company has received two RFC loans totaling $1,300,000, on which it has paid back somewhat less than half of the principle. It is presumed that the Government will finance the $8,000,000 or more in retooling costs for the Detroit plant. The Continental Aviation & Engineering Corp., a subsidiary, is conducting research work at its Detroit laboratory on aviation engines of 500 h.p. and upwards for military use.

Packard Motor Car Co. has begun razing the old plant in which the Liberty airplane engines were made during the last World War preparatory to erecting a new office and assembly building in which to center its aircraft activities. The new building will contain 235,000 sq. ft. of floor space and will have a four-story front for offices and a one-story assembly building in the rear. Completion date is set for March 1. Additional space in the Packard plant also will be used in manufacturing the Rolls-Royce Merlin aircraft engines, while 40 test buildings and a tear-down building remain to be built on the plant property.

Packard engineers expect to have three experimental engines built by March 15 and six experimental jobs completed by Aug. 1. Tooling of the plant is due to be completed by July 1. Production is expected to begin Aug. 15 with an initial output of 15 engines per day. This will be gradually increased

(*Turn to page 467, please*)

Forty-Hour Work Week To Go Into Effect On Oct. 23

The new 40-hour work week, which becomes effective Oct. 23 under the Fair Labor Standards Act, will apply for the first time to the first full work week beginning on or after midnight, Oct. 23, under a ruling made by the wage-hour administrator.

While the maximum work week without overtime is fixed by the law at 40 hours beginning on Oct. 24, the statutory minimum wage does not increase until Oct. 24, 1945, at which time it will be fixed at 40 cents per hour.

Tractor Output Valued At $253,951,435 in '39

Tractor production in 1939 was valued at $253,951,435 a decrease of 28.2 per cent under the 1937 value of $353,296,846, according to the Bureau of the Census. The industry as classified by the Bureau includes establishments engaged primarily in the manufacture of agricultural tractors, tractors used on construction work and industrial tractors.

Need Time To Make Synthetic Rubber

Declaring that 18 months would be required to engineer, construct, and start operation of a 35,000-ton plant for production of synthetic rubber, John L. Collyer, president of the B. F. Goodrich Co., told a group of business leaders meeting in New York recently that "the American public, conscious as never before of its vital dependence on rubber products for peacetime uses and preparedness needs, must realize the significance of this time lag, before assuming that synthetic rubber offers an immediate safeguard against a possible shortage of natural rubber."

Defense Training

Members of a newly organized Red Cross Motor Corps met recently at the Chevrolet Service Department in Detroit to start weekly lessons in handling and maintaining motorized equipment. H. A. Weldon, Chevrolet service expert, is shown here inaugurating the course.

NEWS

Strikes At GM Diesel And Willys Plants End

The UAW-CIO's Drive to Organize Ford Motor Co. "Will Proceed in Orderly and Peaceful Manner," Says Widman

Walkout of 400 members of the Mechanics Educational Society of America from the Detroit Diesel Engine Division of the General Motors Corp. came to an end Oct. 2 when an agreement was reached after a 19-day strike. The men returned to work Oct. 4. The workers went on strike Sept. 13, charging a deliberate slowdown of grievance procedure. No five-day notice of intent to strike was filed as required by the State and GM maintained that the usual week's time for grievance procedure was not exhausted.

Representatives of the corporation and the union reached an agreement under which the members of the M. E. S. A., an independent union, returned to their jobs. The contract between the union and GM was terminated Sept. 25 when W. T. Crowe, plant manager, sent notice to the employes that it was cancelled because the union struck without notice and without exhausting grievance procedure. It was the first such cancellation of a union contract by GM. Manufacture of fuel injectors for marine Diesel engines was held up by the strike.

Renewing its drive to organize the Ford Motor Co., the UAW-CIO launched its plans this month as Michael F. Widman, Jr., assistant organization director of the CIO, arrived in Detroit to take over direction of the campaign. Previously, a UAW committee directed the work.

"The drive will proceed in an orderly and peaceful manner," Widman asserted. "We do not contemplate strikes or cessation of operations. I have been authorized to say that the entire resources of the CIO, both funds and manpower, will be at the disposal of the drive."

A fund of $100,000 already has been made available and if the various locals of the UAW-CIO approve the $1 per member assessment approved at the St. Louis convention and submitted to referendum, an estimated $300,000 will be placed in the fund. With this Widman plans a staff of 40 organizers, nightly radio programs and a Ford workers' publication. The union also is making a fight in the courts to nullify the Dearborn anti-handbill ordinance under which Roy J. Thomas, UAW-CIO president, and several other union officials were arrested last May for distributing union literature at the gates of the Ford Motor Co.

At the executive meeting of the UAW-CIO last month at Buffalo, Walter Reuther, director of the union's GM division, failed of election as a delegate to the National CIO convention, placing eleventh in a field of 19, with 10 to be elected.

An agreement has been reached between the Briggs Mfg. Co. and the UAW-CIO under which the company agrees to reinstate conscripted employes with accumulated seniority at the end of their year's service.

Hearing of the Chrysler benefit case is likely to come before the Michigan Supreme Court during October. Payment of jobless benefits to 23,000 Chrysler workers made idle by last fall's strike has been held up by an injunction issued by Judge Leland W. Carr pending a decision from the court on the validity of the awards.

Fifteen hundred workers at Willys-Overland, Inc., in Toledo, returned to work Oct. 7 on the 1941 models after a one-day "labor holiday" Oct. 4. An agreement was reached between the company and the UAW-CIO after the workers walked out in protest over failure of the company to sign a contract with the union.

Acme

Landing Boat

A new landing boat, powered by two 130 hp. engines and capable of 35 m.p.h., which was delivered recently to the U. S. Navy at Norfolk, Va. The hull is designed for landing troops on swamp land. The craft was built by Chris-Craft Co., Algonac, Mich.

Campaign Note

When Wendell Willkie made his recent campaign swing through Michigan, his entourage rode through the streets of Pontiac in a fleet of glistening 1941 Pontiac torpedo models just off the assembly line. But Willkie himself rode in a slightly used 1940 model convertible sedan.

A special 1941 convertible body had been rushed from the Fisher Body plant at Flint and the car assembled for the reception parade. But the secret service men assigned to guard the Republican presidential candidate took one look at the streamlined car minus any running boards and vetoed its use.

"Where would we stand to guard Mr. Willkie?" they queried.

So the candidate rode in a 1940 model.

MEN . . . . . .

Fred T. Macrae, Jr., has been elected executive vice-president of the White Motor Co., Cleveland. Before assuming the duties of the newly created office, Mr. Macrae served the company as vice-president in charge of production.

Frederic R. Speed has been appointed automotive engineer for the Pennsylvania Grade Crude Oil Association. Mr. Speed succeeds Harry M. Rugg who was killed in a highway accident late in July.

George W. Malcomson has been named assistant sales manager of the truck division, Dodge Brothers Corp.

I. A. Capizzi, Detroit attorney, has been appointed chief counsel for the Ford Motor Co., succeeding Louis J. Colombo, resigned.

Roy A. McElhinney, formerly superintendent of Mid-West Abrasive Co., has been named production manager for all manufacturing units of the company's plants, which are located in Detroit; Owosso, Mich., and Rochester, Pa. Mr. McElhinney will have his office in Detroit where the executive offices for the company are located.

J. H. Marks, purchasing manager for the Packard Motor Car Co. since 1925, has been promoted to the post of vice-president in charge of procurement, machinery and accessories in connection with the Rolls-Royce aircraft engine manufacturing program. He also will supervise the erection of new buildings required by the project. Mr. Marks joined Packard in 1916 as superintendent of construction and supervised details of the Liberty aircraft engine program during the last World War.

Richard P. Dodds, of the Truscon Steel Co., Youngstown, Ohio, was elected president of the National In-

dustrial Advertisers Association at the eighteenth annual conference, Sept. 18-20, at Detroit. He succeeds Charles McDonough, of Combustion Engineering Co., Inc., New York. Reelected vice-presidents were: **E. J. Goes**, Koehring Co., Milwaukee; **Terry Mitchell**, Frick Co., Waynesboro, Pa., and **W. D. Murphy**, Sloan Valve Co., Chicago. New vice-presidents elected were: **H. V. Mercready**, Magnus Chemical Co., Garwood, N. J.; **L. J. Ott**, Ohio Brass Co., Mansfield, Ohio, and **R. T. Reinhardt**, California Corrugated Culvert Co., Berkeley, Calif. **E. C. Howell**, Carboloy Co., Detroit, was elected secretary-treasurer to succeed R. Louis Towne, Surface Combustion Corp., Toledo. **Lloyd R. Vivian**, Ditzler Color Co., Detroit, was chairman of the 1940 general conference committee.

John W. Darr, vice-president and director of public relations of Commercial Investment Trust, Inc., resigned, as of Oct. 1, to become managing director and vice-president of the Institute of Public Relations, Inc., New York.

Dr. Claude L. Clark, formerly of the Department of Engineering Research of the University of Michigan, has joined the metallurgical staff of the Steel and Tube Division of The Timken Roller Bearing Co., Canton, Ohio, as metallurgical development engineer.

John L. Schmeller has been made vice-president in charge of sales of the National Bronze & Aluminum Foundry Co.

Gilbert L. Wolfe has been appointed representative of the American Nickeloid Co., Peru, Ill. Mr. Wolfe will have charge of the Schenectady, N. Y., office and will handle the company's line of pre-finished metals in New York state.

A. D. Lynch has been named personnel director of the Young Radiator Co., Racine, Wis. Mr. Lynch was formerly personnel director of J. I. Case Co.

International

Miami to Rio De Janeiro

A striking photograph of the Pan American Airways Clipper Comet made as the airliner took off recently from Miami, Fla., airport on the inaugural flight of a new substratosphere service to Rio De Janeiro.

Boyce W. Knight has been appointed a special representative in the Middle Western territory for the Young Radiator Co. to serve the Tractor, Truck and Industrial Radiator Division.

Robert E. Brannan has been appointed manager of molding material sales for the Bakelite Corp., Unit of Union Carbide & Carbon Corp., New York, N. Y.

William B. Stout, aircraft engineer and designer, will be the principal speaker at graduation exercises for 17 students of the Ford Motor Co.'s Engineering School, to be held Oct. 12 at Dearborn Inn, Mich.

Thomas Risk has joined the refinery technology division of the Ethyl Gasoline Corp. at Detroit to contact refiners and assist in co-ordinating automotive research activities. He formerly was with the Pure Oil Co. in Chicago.

George H. Johnson has succeeded his father, Hobart S. Johnson, who is now chairman of the board, as president of Gisholt Machine Co., Madison, Wis. He represents the third consecutive generation of the Johnson family to hold this position, the company having been founded by his grandfather, John A. Johnson, in 1889. **H. S. Johnson, Jr.**, has been elected a vice-president. **A. B. Morey** continues as treasurer, and **G. E. Gernon** as secretary.

Walter J. Burns, superintendent of the Chevrolet transmission division at Saginaw since 1936, has been promoted to the post of plant manager, succeeding the late Harold M. Spears. **Caryl Chaney**, night superintendent, becomes superintendent.

New Passenger Car Registrations

	AUGUST 1940	JULY 1940	AUGUST 1939	EIGHT MONTHS 1940	EIGHT MONTHS 1939	Per Cent Change, 8 Months, 1940 over 1939	Per Cent of Total Eight Months 1940	Per Cent of Total Eight Months 1939	TEN MONTHS MODEL YEAR 1940	TEN MONTHS MODEL YEAR 1939	TEN MONTHS MODEL YEAR Per Cent Change
Chevrolet	55,079	77,374	40,666	590,028	424,657	+ 37.0	25.20	23.32	714,367	528,641	+ 35.0
Ford	35,168	54,791	36,933	385,991	336,758	+ 14.5	16.49	18.49	477,281	403,344	+ 28.1
Plymouth	22,039	41,682	25,198	304,061	254,651	+ 19.3	12.99	13.98	332,708	321,943	+ 3.2
Buick	16,604	25,304	10,688	186,335	134,819	+ 38.3	7.96	7.40	237,783	172,650	+ 37.5
Pontiac	11,877	21,033	7,978	152,474	102,159	+ 49.2	6.51	5.61	188,723	127,899	+ 47.6
Dodge	14,154	19,285	12,798	146,466	139,313	+ 5.1	6.26	7.65	159,812	167,382	− 4.5
Oldsmobile	11,246	17,199	8,480	131,919	93,278	+ 41.2	5.63	5.12	165,496	118,681	+ 39.8
Chrysler	6,009	9,262	5,028	69,439	48,555	+ 43.0	2.97	2.67	75,317	59,352	+ 27.0
Studebaker	6,268	9,375	7,618	68,524	51,143	+ 34.0	2.93	2.81	85,687	60,611	+ 41.2
Mercury	5,495	8,045	5,335	57,997	44,037	+ 32.0	2.48	2.42	72,126	50,872	+ 42.0
Hudson	5,599	5,544	3,015	52,494	33,387	+ 57.3	2.24	1.83	68,836	42,794	+ 60.5
De Soto	5,611	7,215	5,010	50,632	38,671	+ 31.0	2.16	2.12	55,565	46,756	+ 18.9
Packard	6,028	6,439	4,541	49,915	32,096	+ 56.1	2.13	1.76	64,740	41,163	+ 57.4
Nash	3,558	4,937	3,362	37,546	36,376	+ 3.2	1.60	2.00	47,167	41,980	+ 12.3
Willys	1,910	2,069	1,038	15,186	8,004	+ 90.0	.65	.44	19,110	9,926	+ 92.5
La Salle	1,492	1,877	1,528	14,889	14,617	+ 1.8	.64	.81	20,091	19,221	+ 4.1
Lincoln	1,498	2,100	1,491	14,501	13,557	+ 7.0	.62	.74	18,527	16,919	+ 9.2
Cadillac	619	941	867	8,041	8,728	− 7.9	.34	.49	10,787	11,384	− 5.3
Graham	237	258	344	1,119	3,185	− 64.9	.05	.17	1,227	3,899	− 68.5
Bantam	62	72		646			.03		797		
Crosley	34	13		291			.01		398		
Hupmobile	34	7	75	74	816	− 91.0		.04	94	917	− 89.8
Fiat				11					20		
Miscellaneous	410	424	440	2,512	2,236	+ 12.2	.11	.13	2,547	2,535	− 0.5
Total	211,031	315,246	182,633	2,341,091	1,821,043	+ 28.0	100.00	100.00	2,819,206	2,248,869	+ 25.3
Chrysler Corp.	47,813	77,444	48,034	570,598	481,190	+ 18.8	24.37	26.42	623,402	595,433	+ 4.7
Ford Motor Co.	42,161	64,936	43,759	458,489	394,352	+ 16.2	19.59	21.66	567,934	471,135	+ 20.4
General Motors	96,917	143,728	70,207	1,083,686	778,258	+ 39.3	46.29	42.74	1,337,247	978,476	+ 36.7
All Others	24,140	29,138	20,633	228,318	167,243	+ 36.5	9.75	9.18	290,623	203,825	+ 42.6

Truck Production by Capacities

(U. S. and Canada)

	SEVEN MONTHS				
	Units			Per Cent of Total	
	1940	1939	Per Cent Change	1940	1939
1½ Tons and less	493,103	466,385	+ 5.5	88.81	91.94
2 to 3 Tons	35,882	22,926	+ 57.0	6.46	4.52
3½ Tons and over	10,320	8,910	+ 16.0	1.86	1.76
Special and Buses	5,187	3,947	+ 31.3	.93	.78
Station Wagons	10,770	5,079	+112.0	1.94	1.00
Total	555,262	507,247	+ 9.2	100.00	100.00

Justice Department Seeks To Divorce GM from GMAC

Alleging violation of the anti-trust laws and seeking to divest the General Motors Corp. of all ownership and control of General Motors Acceptance Corp., the Department of Justice announced on Oct. 4 the filing of a civil action in the Federal District Court in the Northern District of Illinois in another phase of the Government's anti-trust litigation against major automobile companies.

Separate indictments under the Sherman Act were returned in May, 1938, against the General Motors Corp., Ford and Chrysler companies and under civil decrees agreed upon in November, 1938, the latter two divested themselves of all interest in their affiliated finance companies. Indictments against them were, therefore, nolle prossed.

There were two escape clauses in the Ford and Chrysler decrees. One provided that the injunctive relief to be given the two companies would be inoperative if the Government failed to convict General Motors Corp. in the criminal suit. The department of Justice said that the clause was inserted to protect the two companies against a competitive advantage that would inure to the benefit of General Motors in the event of failure to convict that company. In November, 1939, a jury held the General Motors Corp., and its affiliates, the General Motors Sales Corp., General Motors Acceptance Corp., and General Motors Acceptance Corp. of Indiana, Inc., to have been in violation of Sec. 1 of the Sherman Act. The case is now on appeal.

The other escape clause provided that the Ford and Chrysler companies might acquire an interest in an automobile finance company if the Government failed in a civil action to divorce General Motors from ownership and control of its affiliated finance company. The action just taken seeks such a result.

Specifically, the complaint alleges that General Motors Acceptance Corp. is engaged in financing at wholesale cars purchased from the factory by General Motors dealers and at retail General Motors cars purchased on time; that through coercion and discrimination the two corporations acting together require dealers to finance with the affiliate finance company; that the parent organization is thereby able to control the business operations of General Motors dealers despite the terms of the selling agreement between manufacturer and dealer under which the dealer is not considered either the agent or legal representative of the seller. The Justice Department charges that such alleged control results in direct restraint on the movement of General Motors cars in interstate commerce.

Assistant Attorney General Thurman Arnold, head of the department's anti-trust division, said in his announcement of the action that divorcement of the two corporations "will permit General Motors dealers and retail purchasers to choose freely the financing medium for the purchase of General Motors cars."

Mr. Arnold added:

"It will free the dealer from the complete subjugation and control of all his business affairs by General Motors Corp., which has been exercised through the device of the factory affiliated finance company, General Motors Acceptance Corp., and will place the financing of the sale of General Motors cars on a competitive, as opposed to a monopolistic, basis."

Huge Sum Available For Defense Expansion Loans

William S. Knudsen, head of the National Defense Advisory Commission's production division, has been assured by the Federal Reserve System that manufacturers contemplating the expansion of facilities under the defense program currently have access to $3,000,000,000 in loans from established banking institutions. On the basis of the report, the former General Motors executive expressed the opinion that with the enactment of legislation, manufacturers facing the necessity of plant expansion "should have no trouble in obtaining funds for construction promptly and at low rates of interest through their usual banking connections."

The banking survey, covering a cross-section of banks in each of the Federal Reserve districts, indicated that these institutions have available and are willing to loan an amount of money several times that which is believed required for expanding defense production capacity at the present time.

The legislation to which Mr. Knudsen referred permits a manufacturer holding a Government contract for the first time to assign the contract as security for funds needed for plant expansion. Because of this form of security, defense commission members expect that interest rates will be lower than on the usual type of commercial loans. In this connection, after consultation with the War and Navy Departments and the Comptroller General, the commission has developed a new form of contract under which borrowings from the banks are expected to be made by defense manufacturers.

Byron F. Everitt

Byron F. Everitt, one of the pioneers of the automobile industry, died Oct. 5 at Detroit. He was 68 years old. He started in the carriage business in 1891 and in 1899 built the first automobile bodies for R. E. Olds. Later he built the bodies for the Ford motor cars, then sold his share of the business to Walter O. Briggs.

He formed a company to manufacture the Wayne automobile and when that company dissolved he joined William E. Metzger and Walter E. Flanders in organizing the E-M-F Co., building the E-M-F-30. After the E-M-F Co. was bought out by Studebaker in 1910,

Down Mexico Way

A view of one of the many modern bridges that are rapidly replacing wooden structures along Mexico's Pan American Highway running from Laredo, Tex., 766 miles south to Mexico City.

Globe

Everitt was successively identified with companies which made the Everitt, Flanders, Maxwell and Rickenbacker motor cars.

After the Rickenbacker Motor Co. was dissolved in 1927, Everitt went into semi-retirement, although he was president of the Heinze Development Co. and the Sampson Rubber Products Co. at the time of his death.

Defense Contracts

(*Continued from page* 463)

until a rate of 40 engines per day is reached by December. The first order calls for 9000 engines, 3000 for the U. S. and 6000 for Great Britain.

J. H. Marks, former purchasing manager, has been appointed Packard vice-president in charge of procurement, machinery and accessories in conjunction with the Rolls Royce plane engine project.

Meanwhile, Packard is producing marine engines for warcraft use at a rate of better than one a day. Orders to date total 450 engines, of which 178 are for the experimental mosquito fleet which the U. S. Navy is trying out, 200 for Great Britain and 102 for Canada. More than 60 engines had been produced by Oct. 1.

The Cadillac Motor Division of General Motors at Detroit, has 1300 men working on connecting rods, camshafts, crankshafts, piston rings and main connecting rod bearings for the Allison aircraft engines which GM produces at Indianapolis. Cadillac is turning out 20 sets of these major parts a day. The aircraft parts work occupies 200,000 sq. ft. of space in the Cadillac plant but this will in no way interfere with motor car production, according to General Manager Nicholas Dreystadt. Two hundred of the 1000-h.p. Allison aircraft engines were produced during September and the rate is expected to be pushed up to 400 per month by the end of the year. This will increase the Cadillac working force on parts to 3000 men.

Several General Motors plants have received orders for artillery ammunition components. The heavy press plant of the Olds Motor Works at Lansing, has received a $9,505,600 contract for shell casings and work is being rushed on completing the transformation of the old Ryan-Bohn foundry, which was recently acquired. Machinery and tooling are necessary but first delivery of shells is expected by June 1. Entire facilities of the heavy press plant, which contains 150,000 sq. ft., probably will be necessary for the order.

Delco Products Division of GM at Dayton, Ohio, has received orders for $1,616,192 in ammunition components, including fuses, while the Guide Lamp Division at Anderson, Ind., has similar orders totaling $3,592,500.

Other National Defense orders to automotive firms include $743,457 to Clark Tructractor Co., Battle Creek, for tractors; $158,899 to Reo Motors, Inc., for army trucks of two to three-ton capacity; $1,470,000 to Schweitzer-Cummins Co., Indianapolis, for ammunition components; $1,381,600 to Stewart Warner Corp., Chicago, for ammunition components; $780,000 to Electric Auto-Lite Co., Toledo, for ammunition components; $34,451,249 to White Motor Co., for trucks; $14,220,000 to Diamond T Motor Car Co., Chicago, for personnel carriers, and $3,561,500 to A. O. Smith Co., Milwaukee, for ammunition components.

Survey Shows Many Skilled Workers Still Seeking Jobs

Based on a survey of occupations considered essential to the defense program the Bureau of Employment of the Social Security Board reports that on Aug. 31 there were 51,000 machinists, 1600 skilled aircraft and 22,000 metal workers registered at public employment offices.

Caterpillar Offers New Marine Diesels

Two new four-cylinder Diesel marine engines have been announced by Caterpillar Tractor Co., at Peoria, Ill. The addition of these two engines to the line gives the company a complete range of sizes from 25 B.hp. to 135 B.hp. The new units are of medium speed and medium weight, especially well suited for the work boat field.

The larger of the two new engines is the model D8800, which has a bore and stroke of 5¾ in. by 8 in., and develops 70 hp. at 900 r.p.m. The D7700 engine, with a 5¼ in. bore and a stroke of 8 in., develops 60 hp. at the same r.p.m.

1941 Dodge

(*Continued from page* 457)

The action of the rotating driving member in relation to the oil is the same when the car travels or stands still. With the car stopping under the action of the brakes and the engine idling, however, the driven member remains stationary until the motorist, by stepping on the throttle, increases the speed of the driving member beyond the engine's regular idling speed, thereby causing the car to move. When the car is held by the brakes, with engine idling and clutch engaged, the oil is described as being "bent" around the interior vanes "to the extent of 100 per cent." As the engine throttle is opened, the "bending" or by-pass action of the oil decreases until, at average driving speeds, it is only sufficient to provide a desirable cushioning effect in the drive.

The Dodge for 1941 is offered in 10 solid colors and four two-tone color combinations, with two-tone interior color trim.

Eight Months' Exports and Imports

	AUGUST 1939		AUGUST 1940		EIGHT MONTHS ENDED AUGUST 1939		1940	
	No.	Value	No.	Value	No.	Value	No.	Value
EXPORTS								
Automobiles, parts and accessories		$ 14,893,279		$ 15,645,100		$ 177,669,837		$ 164,742,447
PASSENGER CARS								
Passenger cars and chassis	3,874	2,316,439	2,221	1,423,530	101,870	62,289,900	63,124	39,286,986
Low price range $850 inclusive	3,500	1,932,121	2,040	1,228,205	91,067	50,860,062	55,978	31,796,523
Medium price range over $850 to $1200	320	291,349	146	137,413	9,280	8,849,953	6,166	5,862,106
$1200 to $2000	49	68,679	30	43,473	1,244	1,839,135	848	1,232,398
Over $2000	5	24,290	5	14,439	279	740,750	132	395,959
COMMERCIAL VEHICLES								
Motor trucks, buses and chassis (total)	7,585	5,258,863	4,179	4,707,086	82,942	51,312,322	70,234	56,962,250
Under one ton	938	422,759	455	222,923	12,377	5,213,638	9,319	4,229,250
One and up to 1½ tons	5,307	3,177,140	2,977	2,334,042	57,910	31,648,242	46,687	25,884,170
Over 1½ tons to 2½ tons	918	965,194	353	435,080	9,072	8,170,245	9,494	12,106,154
Over 2½ tons	354	599,711	382	1,704,843	3,004	5,755,929	4,583	14,532,862
Bus chassis	68	94,059	12	10,198	579	524,268	151	209,814
PARTS, ETC.								
Parts except engines and tires		2,920,970		5,304,818		27,132,861		31,809,011
Automobile unit assemblies		3,149,381		3,041,691		26,154,944		26,336,574
Automobile parts for replacement (n.e.s.)		388,110		595,892		2,618,837		3,278,017
Other automobile accessories (n.e.s.)		499,956		345,201		4,121,669		2,793,467
Automobile service appliances								
Airplanes, seaplanes and other aircraft (powered)	138	5,967,025	383	24,877,726	993	42,184,616	2,180	133,317,355
Parts of airplanes, except engines and tires (n.e.s.)		3,804,365		2,598,772		12,720,180		14,910,913
INTERNAL COMBUSTION ENGINES								
Stationary and Portable								
Diesel and semi-Diesel—other than automotive	87	207,805	78	222,562	362	1,254,823	658	2,125,193
Other stationary and portable								
Not over 10 hp.	2,224	123,882	1,140	54,785	9,763	567,783	10,020	570,883
Over 10 hp.	228	232,779	209	94,476	1,314	854,208	16,062	2,319,238
Engines for:								
Motor trucks and buses	2,262	266,492	892	98,660	18,513	2,244,933	13,962	1,561,723
Passenger cars	511	53,666	51	7,735	18,617	1,621,571	12,085	1,088,578
Aircraft	221	1,844,180	451	5,065,151	1,220	8,811,116	2,896	26,598,648
Accessories and parts (carburetors)		265,565		532,654		1,882,244		3,252,865
IMPORTS								
Automobiles (dutiable)	91	57,848	67	28,164	413	296,204	441	431,741

Acme

48 School Buses Every 24 Hours

Completed buses and bodies jam a lot adjoining the Superior Coach Corp.'s plant at Lima, Ohio, where the organization at the peak of its season recently was turning out 48 school bus bodies every 24 hours of operation.

Heavy Increase in Steel Shipments to Car Makers

Automotive Foundries Figure Prominently Among Large Pig Iron Buyers At This Time

Steel mill activities reflect the faster tempo of steel consumption in automobile plants. Shipping dates for much steel on order are being moved ahead and some additional business is being placed to piece out tonnages already under contract. In addition to both hot and cold rolled sheets and strip steel, round tonnages of carbon and alloy bars are being purchased. Shipments of bolts and nuts are on the uptrend, and increasing quantities of manufacturers' wire are being taken. Automotive foundries figure prominently among pig iron buyers at this time. The placing of additional Government contracts is reflected in the buying activity of motor truck manufacturers.

While the statistical picture of the steel industry, especially that of the rate of ingot output during the week ended Oct. 12, which the American Iron & Steel Institute reports as being at 94.2 per cent of capacity, indicates that the maximum of production has been reached, there is no uneasiness over the adequacy of the supply in the immediate future. Structural steel for addition of new plants makes up an important segment of current output. Even though this may for some time continue to absorb much of the raw steel supply, once the needed structures are up, pressure from that quarter will lessen. Heavy buying by the railroads in recent months is also expected to taper off as their vital needs have been met. Then, it is expected that more and more steel will be required for shell steel and for other forms of armament, but, in the opinion of leading steel producers, there will be enough capacity available for the production of all the steel needed for peacetime commodities.

Some steel producers are beginning to analyze orders more closely. Anything that smacks of speculative buying, even though it appears to be nothing more than the ordering of tonnages in excess of normal needs, is subjected to scrutiny. Consumers, changing their source of supply in times like these, are likely to receive a somewhat less enthusiastic welcome than is ordinarily accorded to new customers. That the Government means to keep prices on an even keel, was shown by the calling of a conference this week of scrap dealers and scrap consumers with a view to averting further bulges in the price of this essential raw material. The embargo on scrap iron and steel to Japan becomes effective Oct. 16, but so far prices to domestic steel mills have advanced, rather than eased off, as had been expected.

Price stabilization of copper, zinc and lead continues to be one of the objectives of the National Defense Advisory Commission. The speculative element in the copper market is up in arms against the placing of a 12-cent ceiling on that metal. Producers and custom smelters were uniformly on a 12-cent basis at the beginning of the week, but in the outside market a $2.50 per ton premium was being asked.

An early decision whether or not a Government-financed tin smelter will be constructed in the United States is anticipated. A production of between 30,000 and 35,000 tons a year is contemplated. English tin-smelting interests have not been enthusiastic

New Passenger Car Registrations and Estimated Dollar Volume of Retail Price Classes*

PRICE CLASS	NEW REGISTRATIONS								ESTIMATED DOLLAR VOLUME							
	AUGUST				EIGHT MONTHS				AUGUST				EIGHT MONTHS			
	Units		Per Cent of Total		Units		Per Cent of Total		Dollar Volume		Per Cent of Total		Dollar Volume		Per Cent of Total	
	1940	1939	1940	1939	1940	1939	1940	1939	1940	1939	1940	1939	1940	1939	1940	1939
Chevrolet, Ford and Plymouth	112,286	102,797	53.32	56.31	1,280,080	1,016,066	54.75	55.82	$85,800,000	$75,000,000	46.99	48.80	$978,600,000	$743,600,000	48.42	48.30
Others under $1000	68,850	62,362	32.69	34.15	745,584	641,735	31.88	35.25	62,100,000	56,600,000	34.01	36.82	674,300,000	587,900,000	33.37	38.19
$1001 to $1500	28,053	14,120	13.32	7.73	296,821	134,935	12.69	7.41	31,900,000	16,300,000	17.47	10.61	335,900,000	157,000,000	16.62	10.20
$1501 to $2000	979	2,375	.46	1.30	10,153	18,452	.43	1.01	1,700,000	3,600,000	.93	2.34	17,600,000	28,300,000	.87	1.84
$2001 to $3000	451	900	.21	.49	5,859	8,692	.25	.48	1,100,000	2,000,000	.60	1.30	14,200,000	19,800,000	.70	1.29
$3001 and Over	2	44	.....	.02	71	587	.....	.03	10,000	200,000	.....	.13	340,000	2,700,000	.02	.18
Total	210,621	182,598	100.00	100.00	2,338,568	1,820,467	100.00	100.00	$182,610,000	$153,700,000	100.00	100.00	$2,020,940,000	$1,539,300,000	100.00	100.00
Miscellaneous	410	35	.....	.....	2,523	576	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total	211,031	182,633	.....	.....	2,341,091	1,821,043	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

* All calculations are based on delivered price at factory of the five-passenger, four-door sedan, in conjunction with actual new registrations of each model. The total dollar volumes are then consolidated by price classes.

regarding the possibility of post-war competition in the United States, but in the present emergency they are not receiving much support from their government officials. After having gone to as high as 51½ cents a pound, the price of spot Straits tin eased off at the beginning of the week ended Oct. 12 to 51 cents.—W.C.H.

Hints Federal Price Control Over Copper, Lead and Zinc

Leon Henderson, member of the National Defense Advisory Commission in charge of price stabilization, has sent out a veiled warning that Government control over copper, lead and zinc prices may be necessary if "the recent unstable price situation" in these industries continues.

Mr. Henderson, regarded as the Administration's expert on prices even before the advent of the defense commission, expressed himself as reluctant to recommend price control over these metals but emphasized that "their production and use are vital to the national defense program and their price relationship is an important factor in the general stability of prices."

He suggested that because of "recent flurries" in metal prices which he called unjustified, it might be advisable to call a conference of representatives of producers and large consumers to discuss the situation openly. In the event the "apparently artificial price-supply-demand continues," Mr. Henderson is prepared to make suggestions to President Roosevelt on what he thinks might be done under existing law to correct the situation.

North American Aviation Gets $37,770,981 Contract

Award of a $37,770,981 contract to the North American Aviation Co., Inglewood, Calif., for an undisclosed number of aircraft, announced by the War Department, Oct. 3, completes the Army's aircraft program calling for 18,641 units of all types. Earlier the War Department awarded a $141,320,610 contract for aircraft to the Douglas Aircraft Co., Inc., of Santa Monica, Calif.

Other Army orders for aircraft and engines went to the companies listed below. Together with the North American and Douglas orders the awards totaled $388,200,004.

Douglas Aircraft Co., Inc., Santa Monica, Calif., aircraft, $37,462,121.

Curtiss Wright Corp., St. Louis Airplane Division, Robertson, Mo., aircraft, $45,646,882.

Curtiss Wright Corp., Curtiss Airplane Division, Buffalo, N. Y., aircraft, $48,514,819.

North American Aviation, Inc., Inglewood, Calif., aircraft, $72,857,049.

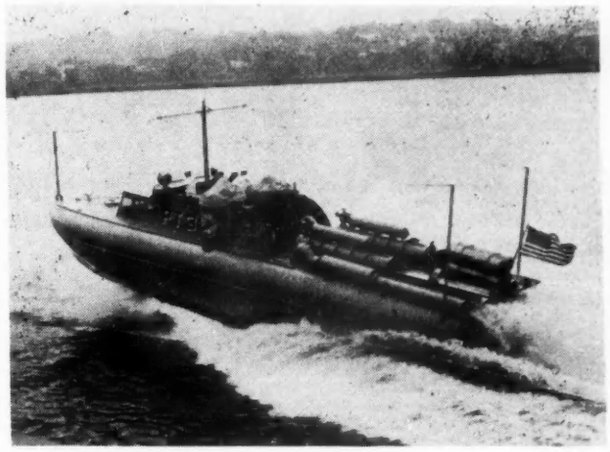
Continental Motors Corp., Muskegon, Mich., engines, $4,727,542.

The Army's program calls for 18,641 aircraft of all types. While a complete breakdown was not available, the War Department announced, prior to awarding the large order to Douglas, that contracts had been placed for 4247 planes provided under the regular appropriation bill and a little more than 9000 out of the 14,394 planes appropriated for in the supplemental defense bill.

On the other hand, the Navy Department made public this breakdown of its aircraft program:

	TYPES			
	Combatant	Training	Utility	Total
Useful planes on hand	1234	422	156	1312
Total planes on hand (Includes obsolete, experimental) ..	1642	428	188	2258
Total planes on order	1502	1467	32	3001

Delivered



The "PT-3", one of the new "Mosquito" boats built for the U. S. Navy. It was delivered recently to the Washington Navy Yard and is shown here being put through its paces on the Potomac River

International

Relax Restrictions On Employe Training

In a move to encourage employe training programs aimed at developing skilled workers, the Labor Department's wage-hour division has relaxed its policy by announcing that attendance at such training classes hereafter will not be considered as working time requiring compensation by the employer.

Attendance, however, must be voluntary on the part of employes and the wage-hour division regards no program as voluntary if a condition of the employe's continued employment is attendance at the training classes. The employe must not produce any goods or perform productive work during such training periods, the course must be given outside of regular working hours and the intent must be to train the workers in a new or additional skill as distinguished from merely making him more efficient in his present job.

Thomas Neal

Thomas Neal, former president and board chairman of the General Motors Corp., died of pneumonia Oct. 5 in Detroit. He was 82 years old. He served as president of GM in 1911 and '12 after a reorganization and later was board chairman. He also was president of General Motors Export Co. until 1915. He was a founder of the Acme White Lead & Color Works and of the Detroit Board of Commerce.

New Truck Registrations

	August 1940	July 1940	August 1939	EIGHT MONTHS 1940	EIGHT MONTHS 1939	Per Cent Change, 8 Months 1940 over 1939	Per Cent of Total Eight Months 1940	Per Cent of Total Eight Months 1939
Chevrolet	17,053	16,384	14,327	132,614	118,642	+ 12.0	33.92	35.20
Ford	12,390	14,447	12,090	103,101	90,063	+ 20.0	27.65	26.72
International	7,397	7,104	6,101	52,074	42,522	+ 22.4	13.32	12.61
Dodge	4,724	4,731	4,709	39,022	36,328	+ 7.4	9.98	10.78
G. M. C.	3,900	4,252	3,031	29,237	22,475	+ 30.0	7.43	6.67
Plymouth	695	919	793	7,155	6,687	+ 7.3	1.83	1.98
Mack	631	718	524	4,893	4,233	+ 15.2	1.25	1.26
White	470	476	365	4,455	2,927	+ 52.6	1.14	.87
Diamond T	537	642	443	4,360	3,316	+ 31.9	1.11	.97
Willys-Overland	214	243	92	1,695	1,054	+ 60.0	.43	.31
Divco	150	106	84	1,154	932	+ 17.5	.30	.29
Federal	121	121	153	1,088	1,003	+ 8.8	.23	.30
Autocar	112	160	185	1,087	1,407	− 22.7	.23	.42
Brockway	137	153	143	989	1,202	− 17.7	.25	.36
Studebaker	92	77	238	857	1,547	− 44.5	.22	.43
Hudson	34	64	23	541	345	+ 57.0	.14	.10
Bantam	16	26	59	300	387	− 22.5	.03	.11
Reo	93	78	23	225	799	− 71.9	.05	.24
Sterling	30	28	33	225	231	− 2.6	.05	.07
F. W. D.	24	17	8	179	125	+ 43.0	.04	.01
Miscellaneous	100	82	70	771	836	− 7.7	.20	.24
Total	48,980	50,913	43,523	391,011	337,095	+ 16.0	100.00	100.00

Business in Brief

***Written by the Guaranty Trust Co., New York, Exclusively for* AUTOMOTIVE INDUSTRIES**

The advance of general business activity to a record level is indicated. The index of *The Journal of Commerce* for the week ended Sept. 28, unadjusted for seasonal variation, stands provisionally at 114.6 per cent of the 1927-29 average, a new peak, as compared with 111.9 two weeks earlier. The New York *Times* adjusted index for the third week of September rose to 108.5 per cent of the estimated normal, highest point in three years, as compared with 107.2 for the week before and 101.1 a year ago.

Retail trade remained above the usual seasonal levels during the week ended Sept. 28, according to the Dun & Bradstreet report. Department store sales during the week ended Sept. 21 were 10 per cent above the corresponding total last year, according to the Federal Reserve compilation.

Production of electricity by the light and power industry during the week ended Sept. 28 rose to an all-time peak, 8.1 per cent greater than the output a year ago.

The movement of railway freight during the same period registered approximately the usual seasonal increase. But the number of cars loaded 822,434, was 7262 below the comparable 1939 figure, showing the first such year-to-year decline since January, 1939.

Bank debits to other than interbank accounts in leading cities during the 13-week period ended Sept. 25 were one per cent less than the corresponding total last year.

Crude oil production during the fourth week of September increased substantially to an average of 3,799,950 barrels daily and was 175,650 barrels more than the required output as computed by the Bureau of Mines, in contrast with an average output 3250 barrels below the requirement in the preceding week.

Average daily output of bituminous coal during the third week of September was 1,546,000 tons, as compared with 1,517,000 tons in the preceding week and 1,533,000 tons a year ago.

Engineering construction contracts awarded during the week ended Oct. 3 were 75 per cent above the corresponding amount last year, according to *Engineering News-Record*. For the year to date, the total is 12 per cent greater than the comparable 1939 awards.

Cotton-mill activity advanced less than seasonally in the week ended Sept. 21. The New York *Times* adjusted index declined to 137.5 from 140.2 for the week before, as compared with 132.6 a year ago.

Professor Fisher's index of wholesale commodity prices advanced further during the week ended Sept. 28 to 82.1 per cent of the 1926 average from 81.9 for the preceding week.

Excess reserves of the member banks of the Federal Reserve system rose $70,000,000 in the week ended Oct. 2 to an estimated total of $6,729,000,000. Business loans of the reporting members decreased $3,000,000 during the week before and stood $346,000,000 above the total a year ago.

40 YEARS AGO

Another concern of world-wide reputation and unlimited means has boldly essayed the heavy trucking problem, and with every promise of success. We refer to the Adams Express Co. We are informed that the company will push their experiments with a steam wagon in actual service, and if further results are as satisfactory as the initial tests seem to indicate, they will gradually replace their heavier horse trucks with the new motive power.

From the *Horseless Age*, October, 1900.

August Crude Rubber Consumption Up 7.4%

According to statistics released by The Rubber Manufacturers Association, Inc., it is estimated that rubber manufacturers in the U. S. A. consumed 50,477 long tons of crude rubber during the month of August. This represents an increase of 7.4 per cent over the July consumption of 47,011 long tons, but is 2.4 per cent below August, 1939, when 51.740 (revised) long tons were consumed.

A. T. Colwell Will Lead SAE In 1941

A. T. Colwell, vice-president of Thompson Products, Inc., has been nominated president for 1941 of the Society of Automotive Engineers. Other officers nominated for the 1941 season of the SAE are, as follows: David Beecroft, Bendix Products Division, Bendix Aviation Corp., treasurer; vice-presidents—Mac Short, vice-president, engineering, Vega Airplane Co., aircraft; Dr. George W. Lewis, director, aeronautical research, National Advisory Committee for Aeronautics, aircraft engine; L. C. Lichty, associate professor, mechanical engineering, Yale University, diesel engine; J. B. Macauley, Jr., research engineer, Chrysler Corp., fuels and lubricants; Karl M. Wise, director of engineering, Bendix Products Division, Bendix Aviation Corp., passenger car; J. R. Hughes, chief body engineer, Studebaker Corp., passenger car body; E. S. Chapman, vice-president and assistant general manager, Plymouth Division, Chrysler Corp., production; Chauncey W. Smith, professor of agricultural engineering, University of Nebraska, tractor and industrial; T. L. Preble, supervisor, automotive transportation, Tide Water Associated Oil Co., transportation and maintenance, and R. S. Reed, chief engineer, Brockway Motor Co., Inc., truck, bus and railcar.

Nominated to membership on the SAE Council, term of 1941-1942, were: N. C. Millman, product service manager, General Motors of Canada, Ltd.; H. O. Mathews, automotive engineer, Public Utility Engineering & Service Corp., and D. A. Fales, associate professor of automotive engineering, Massachusetts Institute of Technology. Continuing on the council for 1941 will be the following men who were elected for a two-year term at the beginning of 1940: Murray Fahnestock, editor, *Ford Field Magazine;* James B. Fisher, vice-president, Waukesha Motor Co.; Austin M. Wolf, automotive consultant. Serving on the 1941 council as past presidents will be Arthur Nutt, vice-president of engineering, Wright Aeronautical Corp., and W. J. Davidson, General Motors Corp.

Ourselves & Government

A Check List of Federal Action Corrected to Oct. 9

FEDERAL TRADE COMMISSION

GM EXCLUSIVE DEALER CASE. Final argument in Washington to be held sometime in mid-October.

F.O.B. PRICE CASE. The commission is awaiting respondent's brief in GM case. The Ford case is still open for testinmony, but no dates have been fixed.

TRADE PRACTICE RULES. Opinion divided as to whether rules, which are opposed by the trade, will be promulgated. No immediate decision in sight.

NATIONAL LABOR RELATIONS BOARD

Board announced on Oct. 4 that a run-off election would be held within 30 days among employes of Delco Radio Division of General Motors Corp., Kokomo, Ind., to determine whether they desire to be represented by the CIO-UAWA or by AFL.

PUBLICATIONS

"It's a New Business Custom" is the title of a brochure published by Durez Plastics & Chemical, Inc., North Tonawanda, N. Y. The use of **Durez** in meeting a wide variety of manufacturing problems is discussed.*

A publication embracing a catalog, engineering data book and price list on **Morse roller chain** has been issued by the Morse Chain Co., Ithaca, N. Y.*

"N.A.D.A. Trade Survey for 1939," published by the National Automobile Dealers Association, gives an analysis of the experience of automobile dealers as revealed from a study of operating statement submitted for the year. Copies are $1 each.

"Arc Welding—A Manual and Operator's

Training Course" has been prepared by the Hobart Brothers Co., Troy, Ohio, for use in welding schools. It is priced at 50 cents per copy.

As an aid to all concerned with the application of small motors, the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has prepared a **"Small Motor Selector"** guide.*

B. F. Goodrich Co., Akron, Ohio, has published a 170-page **"V-Belt Data Book."***

*Obtainable through editorial department, AUTOMOTIVE INDUSTRIES. Address Chestnut and 56th Sts., Philadelphia. Please give date of issue in which literature was listed.

Fuel Injection Symposium Scheduled for Oct. 21-22

The second fuel injection symposium sponsored by the Engineering Experiment Station of the Pennsylvania State College will be held at State College, Pa., Oct. 21-22. There will be two sessions on Monday, Oct. 21. At the morning session (9:30), a paper on Factors Influencing the Injection Lag in a Jerk-Pump Fuel-Injection System will be read by G. W. Baierlein of the American Bosch Corp., and a paper on Quantity-Speed Characteristics of Fuel Injection Systems by O. F. Zahn, mechanical engineer.

For the afternoon an inspection tour through the fuel-injection laboratory of The Engineering Experiment Station is on the program, and there will be another technical session in the evening at 8:30 when W. M. Nichols of the American Lacomotive Co. will present a paper on Correlation Between Injection and Combustion. The final session will be held on Tuesday morning at 9:30, when E. A. Richardson, mechanical engineer of Bethlehem, Pa., will discuss The Gasified Fuel Process for Injection Engines.

Casing Shipments Down In August

Shipments of automotive casings during August were 3.3 per cent below the revised July shipments according to statistics released by the Rubber Manufacturers Association, Inc. Total shipments during August, 4,173,508 units, were below August, 1939, by 16.4 per cent.

Motor Improvements Firm Changes Name

The Board of Directors and stockholders of Motor Improvements, Inc., manufacturers of Purolator Oil Filters, have adopted at recent meetings resolutions changing the company's name to Purolator Products, Inc.

S. William Caldwell

S. William Caldwell, manager of two Ford Motor Co. parts plants at Manchester, Mich., died suddenly of a heart attack Sept. 25. He was 53 years old. He joined the Ford organization in 1911 and from 1930 to 1936 was superintendent of the assembly plant at Long Beach, Calif.

Japan Pushing Efforts To Increase Car Exports

Spanish Economic Mission Reported to Have Arranged for a Sample Consignment of Medium-Sized Passenger Automobiles

The Spanish Economic Mission now visiting in Japan is reported to have arranged with the Toyota Automobile Co. for a sample consignment of Toyota's new medium-sized passenger car, called New Japan. Specifications have not yet been released to the public.

Japan's delegation to Dutch East India, which will press the orphaned Dutch government-general for voluntary inclusion of the rich, populous colony in Japan's projected Asiatic "co-prosperity sphere," will specifically investigate the market for Japanese-made small cars besides arranging for deliveries of crude oil, rubber, tin and other raw materials. Japanese automobile men look forward to the Batavia discussions with great optimism because of the long-entrenched German competition in the small-car field—and the Indies are essentially a small-car market—has disappeared, while imports from England are gradually fizzling out, according to Japanese consular reports. The Japanese delegation is headed by Commerce and Industry Minister Ichizo Kobayashi.

Meanwhile, the Department of Finance has disclosed that a total of 2201 complete cars was exported during the first half of 1940, which compares with 1469 and 488 for the corresponding periods of 1939 and 1938. Shipments of chassis reached a value of 3.1 million yen, as compared with 1.7 million yen last year. The number involved was 1281, as against 595 last year. Exports of parts and accessories are also looking up. Shipments during the first half of the year reached a value of 19.7 million yen, as against 11.7 million yen last year. Though a breakup by destinations is not available, it is believed that Australia, New Zealand and Latin America have come in for a large share of these shipments.

A release by the Cabinet Bureau of Statistics indicates that employment in the vehicle, aircraft and shipbuilding industries has increased 68 per cent since the outbreak of the China "incident" three years ago, bringing the total employment in this group to 487,043, the largest on record for any industry. A close runner-up is the machinery and machine-tool industry with 461,585 employed, an increase of 121 per cent on July, 1937.

Establishment of a big "national policy" coroporation to produce Diesel automobiles for use in China and Manchuria is being discussed among leading Japanese Diesel engine makers. It is proposed that the new corporation is to pool the capital, patents and technical skill of the leading builders under the guidance of the War, Commerce-Industry, and Railway Ministries.

The long-planned National Automobile Research Institute has finally been established, and a site covering 280,000 sq. yd. has been selected at Murakami in the suburbs of Tokyo. The Japanese name of the institution is Kokuritsu Jidosha Kenkyusho.

CALENDAR

Conventions and Meetings

American Society for Metals, Annual Meeting, Cleveland, Ohio.....Oct. 21-25
American Welding Society, Annual Meeting, Cleveland .....Oct. 20-25
SAE Nat'l Aircraft Production Meeting, Los Angeles .....Oct. 31-Nov. 2
SAE National Fuels & Lubricants Meeting, Tulsa, Okla. .....Nov. 7-8
Aeronautical Chamber of Commerce of America, Inc., Annual Meeting, New York .....Dec. 5
National Association of Manufacturers, Annual Meeting, New York....Dec. 9-13
SAE Annual Meeting, Detroit. Jan. 6-10, 1941
National Automobile Dealers Association, Convention, Pittsburgh, Pa. Jan. 20-23, 1941

Shows at Home and Abroad

Detroit Automobile Show .....Oct. 12-19
National Automobile Show, Grand Central Palace, New York.....Oct. 12-20
Pittsburgh Automobile Show.....Oct. 19-26
National Metal Congress & Exposition, Cleveland, O. .....Oct. 21-25
Chicago Automobile Show....Oct. 26-Nov. 3
Automotive Service Industries Show, Chicago .....Dec. 9-14
Machine & Tool Progress Exhibition, Detroit .....Mar. 24-29, 1941

Bendix-Westinghouse Air Brake Co. To Elyria, Ohio

The Bendix-Westinghouse Automotive Air Brake Co. has announced that it will transfer its general office and manufacturing facilities from the present location in Pittsburgh, Pa., to Eyria, Ohio.

Freeland O. Stanley

Freeland O. Stanley, 91, co-inventor with his twin brother, Francis E., of the Stanley Steamer automobile, died Oct. 2 at his home in Newton, Mass. The Stanley brothers started manufacture of the famous Steamer in 1897. Two years later they sold the rights to a New York group for $250,000, then bought them back the next year for $20,000. In all, they built more than 10,000 cars before they sold the rights for the second and last time in 1917.

Safe behind